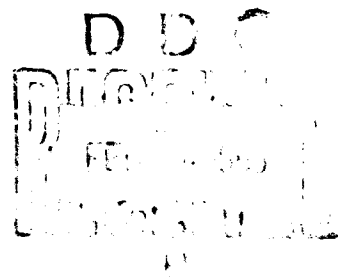
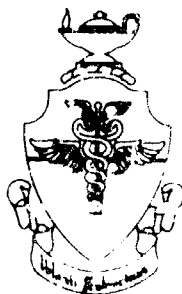


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PSYCHIATRIC STRENGTHS AND WEAKNESSES OF TYPICAL AIR FORCE PILOTS

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APPROXIM 100
WHITE S.G. LOW
DGC
BUFF SECTION
WATER FOUNDED
INSTRUMENTAL

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ABSTRACT

Fifty pilots were selected at random from a larger group of 250 aircrewmen who participated in research on intensive medical evaluations. Test scores and other data from a comprehensive psychologic test battery and a background questionnaire were analyzed and integrated to yield a picture of the personality structure of the modal military pilot.

FOREWORD

This paper was prepared in the Neuropsychiatry Branch under task No. 775504. The work was accomplished between September 1965 and March 1967. The paper was submitted for publication on 6 August 1968.

This report has been reviewed and is approved.



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PSYCHIATRIC STRENGTHS AND WEAKNESSES OF TYPICAL AIR FORCE PILOTS

I. INTRODUCTION

Military flyers are a group of men who have successfully adapted to a uniquely stressful 20th century life style: chronic exposure to danger, sudden and frequent shifts of environment, demands for a high level of performance in their jobs, tight discipline, long separations from family, and the internal psychic stresses of flying.

Bond (1) and Grinker and Spiegel (2), during World War II, used detailed case studies of flyers grounded for emotional causes to identify these intrapsychic stresses. Both noted that flying attracted action-oriented men. In Bond's formulation, under stress the aircraft could unconsciously become a narcissistically invested phallic symbol and maneuvering the aircraft a representation of sexual potency. Flying therefore might allow unconscious gratification of oedipal fantasies, exhibitionistic flaunting of aggressive power and a defense against latent homosexuality. Grinker and Spiegel added that the high degree of aggressive behavior and control over the environment in military air operations tended to activate unresolved patricidal fantasies and stimulated feelings of defensive omnipotence.

Despite these stresses, rates of suicide (3) are somewhat lower and rates of mental hospitalization and psychiatric disorder (4) are lower among military flyers during ordinary operations (estimated to be around 80%) than for a comparable group in the general population. Most pilots not only tolerate their style of life well but seem to thrive on it. Indeed, it is doubtful that a randomly selected group of

similarly endowed men could function as effectively. These facts lead us to the thesis that there is a personality pattern common to successful professional flyers, with strengths and weaknesses so balanced that they adapt well to their particular life style.

The study being reported here was designed to explore this hypothesis. It is a modal description of a randomly selected group of experienced pilots who have never suffered psychologic or physical breakdown. We hope that our findings will both contribute to an empirical understanding of psychiatric normality, and be helpful to the increasing number of psychiatrists who, despite their own typically different types of personality, life styles, and background, are called upon to make rapid, yet balanced, evaluations affecting the lives and careers of these flyers.

II. METHOD

The study was conducted at the USAF School of Aerospace Medicine, a consultation service for worldwide Air Force operations. A special evaluation program to generate physical and psychologic norms for astronaut selection provided an opportunity to study a randomly selected group of flyers. At about age 30, they were in a stable portion of their life cycle and living under the relatively peaceful conditions of 1964. Fifty pilots were selected in random sequence from a larger group of 248 rated Air Force pilots and navigators who represented a cross section of Air Force flying officers. These men were in residence at the school for 7 days.

Our approach to data collection was based on the materials on hand at the base and requirements of the normative project. It followed several steps: a literature review to identify important variables in personality development; 25 clinical interviews to relate these variables to the population under study; selection of a well-standardized, clearly relevant battery of psychologic tests; and construction of a supplementary questionnaire.

The literature review (5) and interviews indicated a relative emphasis on coping styles, ego functions, affect life, signs of neurotic conflict, and past history as a reflection of character modes, particularly in relationship to developmental phases, socioeconomic information, and current life adjustment. For this reason standardized tests in widespread use by American psychologists (16) were chosen, analyzed, and interpreted to contribute maximally in these areas. The psychologic test battery included two self-evaluating tests—the Minnesota Multiphasic Personality Inventory and Edwards Personality Preference Schedule; two projective tests—the Rorschach Psychodiagnostic Test and Thematic Apperception Test; two tests of intelligence—the Wechsler Adult Intelligence Scale and the Miller Analogies Test; and the Bender Visual Motor Gestalt Test. The supplementary questionnaire was designed to consider significant areas not otherwise covered. We also had access to physical findings and socioeconomic information from another source.¹ In all, approximately 1,500 questions were answered by each man over the course of 12 hours. Tests were administered by technicians and the Rorschach by a clinical psychologist.²

After the data had been collected, all questions were individually analyzed for mean values. Later each test and the entire battery were integrated into a modal personality description.

¹An extensive medical symptom questionnaire containing some background information (7) and thorough physical evaluation.

²1st Lt. Col. Charles L. Jennings, 1st Lt. Donald Barnow, SSgt. John Corbett, A1C Peter Montgomery, and A2C A. Igartua-Munos carried out most of the testing. Some descriptive statistics on this and similar samples have been separately reported by Dr. Jennings (9).

III. RESULTS

Results will be presented by test with an explanation of the instrument and interpretive summary when indicated. Detailed tables, graphs, and other quantitative material are included to facilitate comparisons of pilots with groups studied by others. This is done in the hope that the data will contribute to systematized efforts toward general understanding of psychiatric normality. Our own detailed synthesis of these specific results is contained in section IV of this report.

Standardized self-evaluation tests

MMPI. The MMPI is a forced-choice test consisting of 566 items to which the subject responds either "yes" or "no." It is widely used as a screening test for psychopathology.

The clinical scales of the MMPI are for hypochondriasis, depression, hysteria, psychopathic deviate, masculinity-femininity, paranoia, psychasthenia, schizophrenia, and hypomania. The validity scales measure various aspects of the testee's approach to revealing himself. Reference to figure 1 indicates a modally "healthy" profile. No overt psychopathology was found and the subjects are shown to be cooperative. A slight elevation of the K scale was interpreted to indicate a need in pilots to present themselves favorably. Similar results were found in MMPI analysis of flyers by Fulkerson et al. (9).

Since the study was done on well-functioning individuals, several nonclinical, self-descriptive scales were also measured. These included ego-strength, leadership, social participation, self-sufficiency, social responsibility, impulsivity, emotional immaturity, and hostility. These scales have been described by Dahistrom and Welch (10). In our review of these special scales, we found many items appearing in more than one scale and observed that some items bore little apparent relationship (face validity) to the names of the scales. We turned to the literature for norms and evidence of scale validity, and found little information against which to evaluate our pilot-subjects. Never-

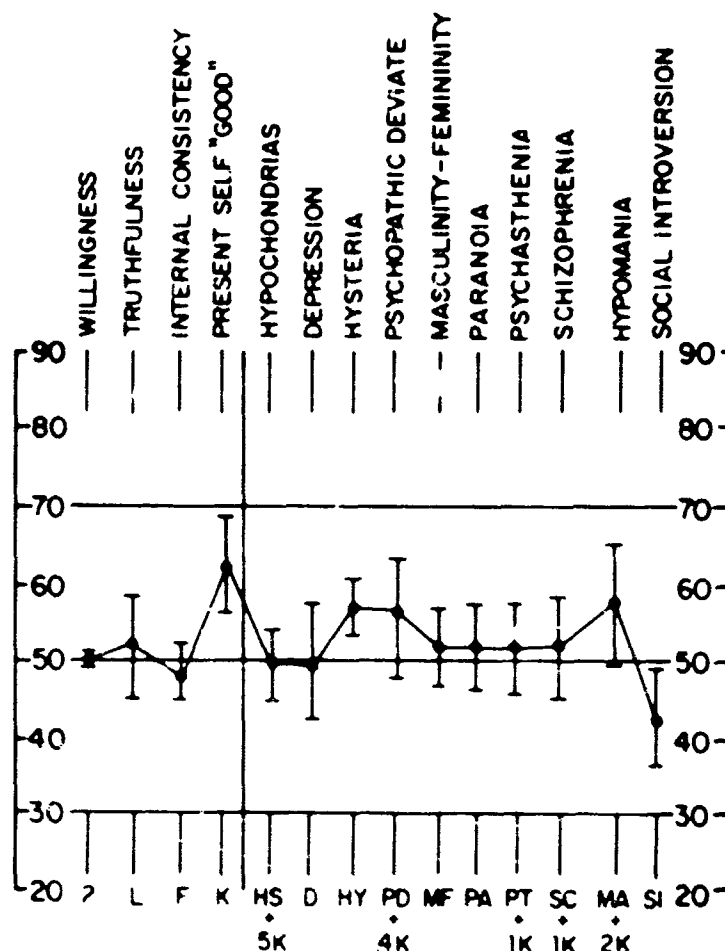


FIGURE 1

Graphic summary of average scores on the clinical scales on the Minnesota Multiphasic Personality Inventory (MMPI).

theless, since these special scales seemed to offer some promise, a content analysis was done to determine how these scales might best fit into our conceptual framework. The results are presented in table I.

Table I shows that the group modally described itself as highest in intellectual striving; a sense of obligation to the group; a capacity to deal with the environment; self-confidence; an ability to take initiative; and a desire to be with others. Scores were lowest for overt anti-social behavior; overt emotional disturbance; and presentation of an unrealistically favorable

picture on the test. "Hostility," a general distrust and dislike of other people, was somewhat low, but variable. In general, then, scores on these special scales were high on the socially "desirable" traits and low on those more obviously undesirable.

In summary, the MMPI results described these pilots as having a high sense of obligation to the group, strong self-control, and a good ability to relate socially to other people. Modally, they did not report serious emotional upsets or adjustment problems; rather, this self-descriptive profile was that of a group of

TABLE I
MMPI scores on the special scales, listed in rank order based on percentages

Abbreviation	Title of scale	Interpretation derived from content analysis	Number of items	Mean score	S.D.	Range	Percent positive
Ie	Intellectual efficiency	Intellectual striving	39	34.1	2.4	27-38	87.3
Sp	Social participation	Sense of obligation to the group	25	21.0	2.9	11-25	84.0
Sf	Self sufficiency	Capacity to deal with the environment	34	28.0	4.4	14-34	82.4
Lp	Leadership	Self-confidence	50	41.0	4.0	29-47	81.9
Es	Ego strength	Ability to take initiative	68	54.1	3.1	47-58	79.6
Eo	Ego overcontrol	Tendency to hold back	23	12.0	3.2	6-20	52.1
Or	Originality	Feelings and opinions differ from others	25	12.9	2.3	7-18	51.7
Rg-M	Rigidity	Anxiety concerning social situations	10	4.4	1.1	3-8	44.0
Hv Ho	Overt hostility Hostility	General distrust and dislike of others	50	12.1	6.9	2-32	24.2
Im	Impulsivity	Lack of self-control	21	5.0	2.2	1-10	23.7
—	Plus getting	Presenting an unrealistically favorable picture of oneself	56	11.4	4.9	5-30	20.3
Em	Emotional immaturity	Overt emotional disturbance	48	6.8	2.8	2-14	14.1
—	Hostility control	Overt antisocial behavior	34	3.9	1.8	1-9	11.4

men who are energetic and have high opinions of themselves.

EPPS. The Edwards Personal Preference Schedule is a forced choice test of 247 items that measure the subject's description of himself in terms of 15 relatively independent variables, plus a consistency score. This test, unlike the MMPI, has traditionally been used to study normal aspects of personality (11). It includes scales titled achievement, deference, order, exhibition, autonomy, affiliation, intrareception, succorance, dominance, abasement, nurturance, change, endurance, heterosexuality, aggression, and consistency.

A content analysis was performed to determine how each scale might be interpreted most

meaningfully in terms of total personality. This analysis showed that questions were phrased in such a way that the scales reflected the respondent's ego-ideal. The title of each scale was assigned an interpretation phrased in less technical language, and a mean score determined. These mean scores were then converted to percentile norms for the general population. The profile is shown in figure 2.

It can be seen that the modal pilot thought it most desirable to dominate, seek new situations, and set high standards. Somewhat to our surprise, he thought it desirable to be able to introspect. Seeing things through, making a good impression, and heterosexual effectiveness were also considered desirable traits. In contrast, the pilot considered it undesirable

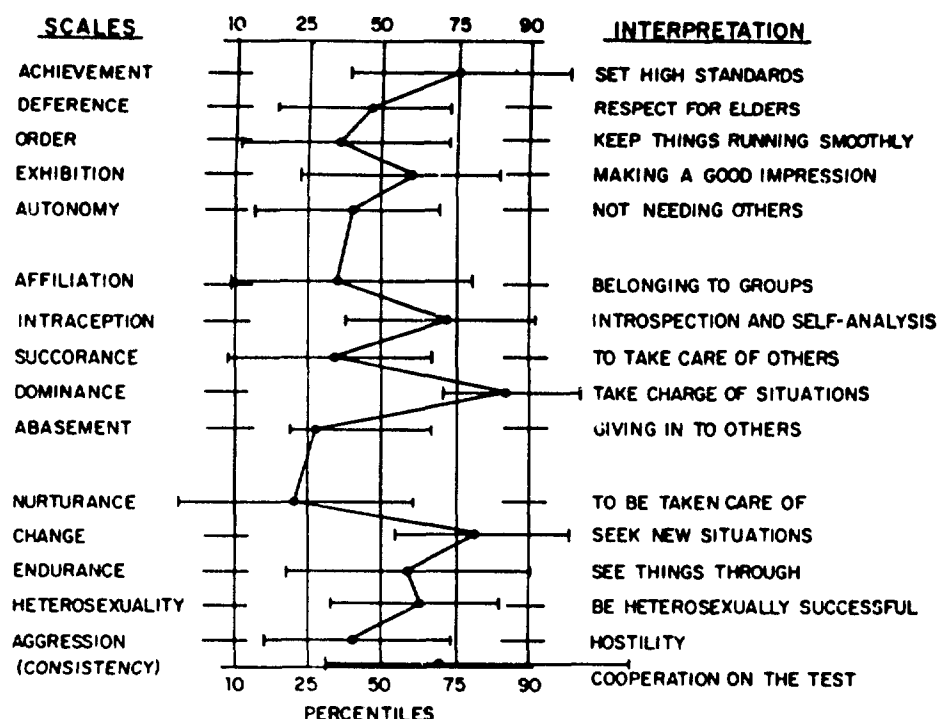


FIGURE 2

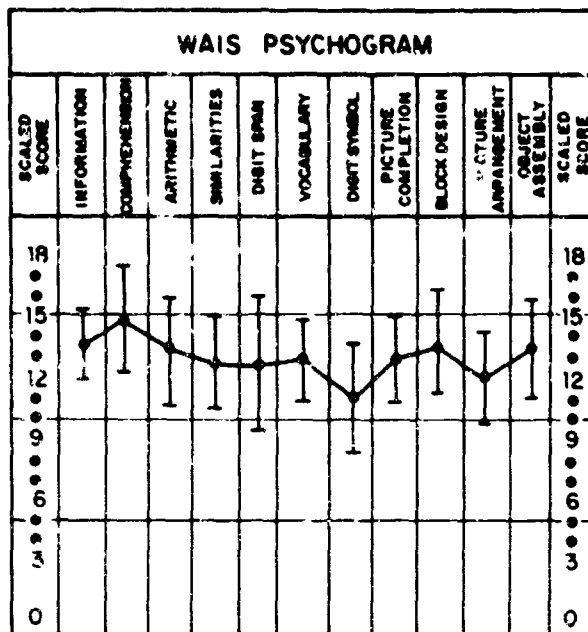
Graphic summary of average scores on the Edwards Personal Preference Schedule (EPPS).

to take care of others, to be taken care of, and to give in to others. Autonomy, belonging to groups, and (again unexpectedly) keeping situations in order were also considered undesirable. Aggression and respect for elders were neutral. Means from a comparable but independent sample of Air Force personnel (12) suggest these self-concepts are widespread in this vocational group. In common with the MMPI, the consistency score was high, indicating that the subjects were cooperative in taking the test.

In summary and again in terms of ideal self-image, the modal pilot considered it desirable to dominate, seek change, and set high standards. He thought it undesirable to be taken care of, take care of, or give in to others.

Objective tests

Wechsler Adult Intelligence Scale. The WAIS is an individually administered test of intelligence. It is a well-standardized instrument consisting of six verbal and five performance subtests. It provides separate verbal, performance, and full-scale intelligence quotients. As shown in figure 3, the modal pilot was in the upper limit of the bright-normal range (mean Full Scale IQ=119). The difference between Verbal and Performance IQ was not large (Verbal IQ = 119 and Performance IQ = 116). The subjects performed essentially at the same level from test to test and within each test indicating that, with regard to intelligence, they are a homogeneous group—more homogeneous than comparable civilian



VIQ = 119
PIQ = 116
FSIQ = 119

Graphic summary of average scores on the Wechsler Adult Intelligence Scale (WAIS).

groups (13). The highest subtest score was in comprehension, suggesting that the group is capable of functioning with maximal intellectual efficiency when required, but functions at a somewhat lower level much of the time.

Miller Analogies Test. The Miller Analogies Test is a timed group test of ability for higher order verbal abstraction. It consists of 100 multiple-choice paired analogies; the scores correlate highly with general intelligence and verbal achievement (14). Educational achievement has an influence on the scores.

The mean raw score for this group was 44.02 with a standard deviation of 13.40. Scores ranged from 24 through 90. Since the WAIS Full Scale IQ's for this group were in the range for college graduates, it was anticipated that the group mean would be near the 50th percentile for college graduates. The mean score (44.02) places the group at the 37th percentile for people with nonscientific degrees and the 17th percentile for people with scientific degrees. This difference, as in the

case of the WAIS, suggests that the modal pilot is not utilizing all of his intellectual capacity.

Bender Visual Motor Gestalt Test. The Bender Visual Motor Gestalt Test (15) consists of nine geometric figures to be reproduced by the subject. The figures were drawn after 10 seconds of inspection and subsequently after approximately 75 minutes without seeing the figures again. Bender protocols were scored according to the Pascal-Suttell system (16). The mean Pascal-Suttell score was 26.00 with a standard deviation of 14.04 and a range of 3 to 60, all within normal limits.

The reader should evaluate conservatively the Bender scores obtained from the Pascal-Suttell system. We have found, in practice, that this scoring system obscures much of the clinical value of the test, and prefer Bender's more clinically oriented approach to evaluating the patient's performance. No significant Bender signs were seen in this sample. As would be expected, rigorous job requirements

had screened out those with perceptual-motor problems. Typically, however, these subjects drew the designs rapidly and somewhat carelessly, then went back to correct the more obvious errors. We interpret this as a sign of some impulsivity combined with a need for good performance.

Projective tests

Rorschach. The Rorschach test consists of a series of 10 "ink blots," the responses to which are considered an expression of the organization of perception in terms of projected needs, experiences, and habitual patterns of responses, as well as the stimulus properties of the blots. The responses which are elicited reveal the respondent's inner promptings, motivations and drives, control over impulses, approaches to problems, and other aspects of personality. Klopfer and Davidson's approach (17) was used to interpret the Rorschach results.³

Figure 4 compares the scores on the determinants (the quality of the blot which determined the response) with usually accepted

³Scoring followed directions in an earlier text by Klopfer et al. (18) with location scores according to Beck (19).

normal values. Table II contains the means and standard deviations of the scores, as well as "normal" values derived by consensus from several accepted sources and interpretations for the major scoring categories and ratios. In general, the ratios presented in table II are more sensitive to personality structure and functioning than the specific location and determinant scores as such.

In summary Rorschach results indicate that these pilots typically:

1. Are free from significant psychopathology.
2. Are productive but not richly productive; have a reasonable amount of spontaneity without a compulsive need for quantity; and place an emphasis on commonplace behavior in a practical, impersonal, and matter-of-fact manner, with somewhat narrow interests.
3. Have an adequate ability to organize and integrate but with a level of aspiration higher than their intellectual ability warrants.
4. Are responsive to the environment.
5. Are less accepting of internal impulses and fantasies but integrate them adequately.

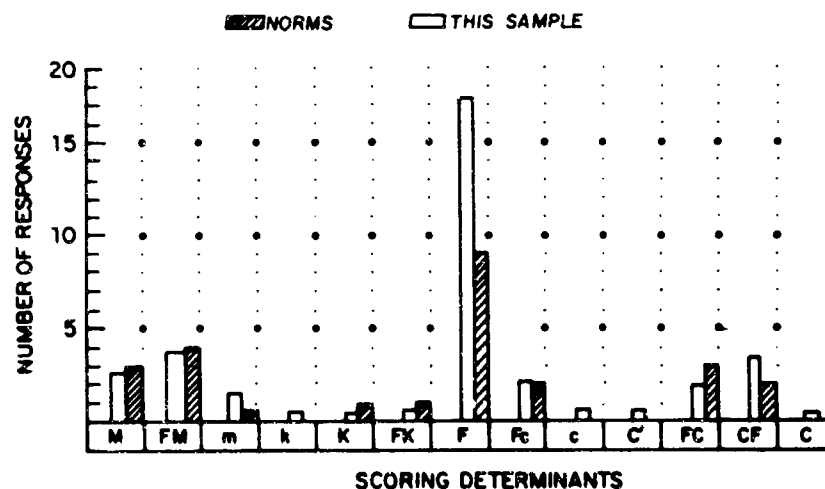


FIGURE 4

Graphic summary of average Rorschach scores.

TABLE II
Means and standard deviations for this sample, "normal" values, and interpretation of the Rorschach results

Scoring variable	Abbreviation	Mean	S.D.	Usual normal value	Interpretation
I. General response characteristics					
A. Location					
1. Total number of responses	R	35.5	27.8	20-45 (25)	This score is midway in the normal range indicating productiveness but without a compulsive need for quantity.
2. Percent of responses using the whole blot	W%	40.2	21.9	20-30%	This variable is a measure of ability to organize, seek relationships, and function abstractly. Since it exceeds the normal ranges it suggests ambitiousness in excess of intellectual ability.
3. Percent of responses using conventional parts of the blot in a conventional manner	D% + d%	45.5 +5.4	16.3 +7.0	50-70%	This score is within the normal range but at low end; it indicates a practical everyday application of common sense.
4. Percentage of responses using unusual details or white spaces	Dd% + S%	5.5 +3.5	6.9 +4.5	10%	This is within the normal range and shows responsiveness to the environment.
B. Form					
5. Percentage of responses determined by the blot's form	F%	44.8	17.6	20-50	This score is within the normal range; it indicates the ability to be impersonal and matter-of-fact; when movement, shading, and color are used elsewhere in the protocol, it shows a good sensitivity to interpersonal relationships, a feeling of comfort with other people, but a need to exercise some restraints.
6. Percentage of responses with conventional form	F + %	72.8	19.8	75	This score is within normal limits and indicates generally adequate functioning and integration.

TABLE II (contd.)

Scoring variable	Abbreviation	Mean	S.D.	Usual normal value	Interpretation
C. Movement					
7. Number of human movement responses	M	2.5	2.7	3	This score is more than 2 but less than the desired 3; it suggests some mild attenuation of acceptance of self, impulses, and fantasies, but intact imagination, empathy, and ego functioning.
8. Number of animal movement responses	FM	3.6	2.8	4	This score exceeds "M" slightly, suggesting some mild emphasis on immediate gratification of impulses.
9. Number of inanimate "movement" responses	m	1.5	2.1	0.5-2.0	This score is on the high end of the acceptable limits of 1-2; and therefore indicates some underlying tension or conflict; at this level there is general awareness of this tension and adequate ability to control it most of the time; the score also shows a capacity to adjust to the tension since "m" responses are not repressed.
D. Texture					
10. Number of shading responses with form predominant	Fc	2.2	2.3	2	This score is within normal limits; it indicates an awareness of and acceptance of some affectional needs, as well as the needs and feelings of others.
11. Number of shading responses where shading dominates form	cF	0.5	1.0	0-1	This score is within acceptable limits in view of the remainder of the protocol; it indicates that the handling of affectional needs is satisfactory.
E. Color					
12. Number of color responses with form predominant	FC	2.0	1.8	3	This score is within acceptable limits; it is a dependable sign of good adjustment, and indicates the capacity for controlled but spontaneous responses to emotionally laden stimuli.
13. Number of color responses where color dominates form	CF	3.4	2.8	2	This score is somewhat elevated and suggests a spontaneous but appropriate and genuine responsiveness to emotional stimuli, which can lead to impulsive behavior.

TABLE II (contd.)

Scoring variable	Abbreviation	Mean	S.D.	Usual normal value	Interpretation
14. Number of "pure" color responses	C	0.2	0.5	0-1	Not significantly elevated.
16. Number of responses in which an achromatic blot is perceived to have color characteristics	C'	0.5	1.2	0-1	This score is within normal limits and indicates a sensitivity to the stimulus qualities of the blot. It is sometimes considered to indicate primitive color responses, and within a context of this protocol suggests a mild emotional immaturity.
16. Number of "vista" responses (3 dimensional depth)	FK	0.6	1.3	1	Not significantly elevated.
17. Number of responses which are highly conventional	P	6.2	2.9	3-10	This score is within normal limits; it indicates a capacity to see the world as others see it.
II. Inner resources and impulse life					
18. Ratio of human movement to animal movement responses	M:FM	25:3.6 (0.7)		0.5-1.5	The ratio is approximately 0.7; this ratio is typical of a substantial portion of our culture in which instinctual gratification is more important than inner values; there are suggestions of some attenuation of the pursuit of long-range goals and some mild immaturity, in view of more CF than FC.
19. Ratio of human movement to the sum of animal and inanimate movement responses	M:FM + m	25:5.1 (0.5)		1.0-1.5	The ratio of approximately 0.5 indicates that inner tensions plus some impulsivity and some emphasis on immediate gratification may interfere with mature pursuit of long-range goals and satisfaction of inner values.
III. Emotional response to the environment					
20. A weighting of color responses	$\frac{\text{SUM C}}{(\text{Fc} + 2\text{CF} + 3\text{C})}$	4.7	3.4	3+	This score exceeds the minimum requirement of 3; it indicates an appropriate reactivity to emotional stimuli.

TABLE II (contd.)

Scoring variable	Abbreviation	Mean	S.D.	Usual normal value	Interpretation
21 The ratio of form-predominant color responses to the remaining color responses	FC:CF+C	20:3.6 (0.6)		3.2 (1.5)	The ratio is approximately 0.6; CF + C is present; therefore, control is not excessive or rigid and socialized responses are not superficial; but CF + C exceeds FC, which suggests some problems in control of emotional impulses.
22 Percentage of responses to cards 8, 9, and 10	%R (8,9,10)	37.3	8.8	30-40%	This score is within normal limits; it indicates normal responsiveness to stimulation from the environment; this and other signs indicate an outward (extratensive) orientation, this mode appears so long-standing as to be natural for this modal pilot, who is clearly more extratensive than introverted, and responds to external objects and people more than to inner processes and goals.
IV Introverted-extravertive balance					
23 The ratio of color to human movement responses	M: SUM C	25:4.7 (0.5)		3:3.6 (0.9)	The ratio is approximately 0.5; M is greater than 2 but approximately half of sum C; this indicates that the modal pilot is more dependent on environment for comfort and stimulation than on internal processes, values, and goals.
24 Ratio of animate movement responses to color responses	FM + M:FC+C+C'	61:2.7 (2.3)		7:3.5 (2.0)	The ratio is approximately 2.3 and is the reverse of M:Sum C; it reinforces earlier interpretations of sensitivity to the needs of self and others, but with some emphasis on immediate gratification.
V Organization of affectional needs					
25 The ratio of "vista" and shading responses to form responses	FK + Fc:F	28:17.5 (0.2)		(0.25-0.75)	The ratio is low (0.2); it indicates some denial of and oversensitivity to the needs of self and others, which is, however, integrated reasonably well into the total personality structure.
26 The ratio of achromatic to chromatic color responses with form predominant	(Fc+c+C'): (FC+CF+C)	32:5.5 (0.6)		1:3 (0.3)	This ratio is within normal limits; it indicates a good ability to interact in the social environment, but the more primitive color responses exceed the more mature, so there is some tendency to express emotionality and to act out.

TABLE II (contd.)

Scoring variable	Abbreviation	Mean	S.D.	Usual normal value	Interpretation
VI. Intellectual interest and ambition					
27 The ratio of whole to human movement responses	W:M	120:2.5 (4.8)		6:3 (2.0)	This ratio is quite high; it indicates that the level of aspiration exceeds intellectual ability.
28 Percentage of animal responses	A%	39.6		20-35%	This score is somewhat above the normal range; it indicates more commonplace behavior and narrow interests, but it is not high enough to be a sign of disturbed adjustment.

6. Place a relative emphasis on immediate gratification rather than goals and values; are mildly lax in terms of emotional control over inner tensions; have a potential to act out; but are generally aware of and able to handle these inner tensions.

7. Are generally aware of and accept their needs of self and others but have a tendency for oversensitivity to others and undersensitivity to self. Despite this, affect needs are adequately integrated into the personality structure.

8. Are more dependent on the environment for comfort and stimulation than on inner processes; have a good capacity to function in social situations, but with some tendency to act out and a need for distance and restraint in interpersonal relationships. Attempts at closeness by others typically precipitate some anxiety.

The inner tensions are of particular interest, and seem to be related specifically to two different problem areas: (1) a disparity between ambition and achievement; and (2) partially unresolved affectional needs, with needs for both closeness and distance existing side-by-side.

Thematic Apperception Test (TAT). The TAT is a commonly used projective test developed by Murray (20). It consists of a set of 31 cards. All but one (a blank) contain relatively unstructured pictures of people in various combinations of age and sex. The subject tells a story for each card, including what has happened prior to his interpretation of the situation depicted, what is happening "now," and what the outcome will be. The pictures were selected by Murray to elicit responses to situations and problems characteristic of interpersonal interactions in our culture. The themes of the stories are usually interpreted in terms of needs (goals expressed) and presses (forces acting upon the patient).

We used 11 cards⁴ depicting 10 situations and the blank which we have found helpful in evaluating aircrewmembers over the past 10 years. The test was administered by a psychometric technician, using the standard Murray instructions, except that no inquiry was conducted. Stories were recorded verbatim. We developed our own scoring system based upon dimensions

⁴Cards 1, 2, 3RM, 4, 6RM, 7RM, 8RM, 12M, 13MF, 15CF, and 18RM

particularly relevant to the structural and developmental concepts on which we based our entire approach. Each protocol was scored for total wordage and reaction time on individual cards and according to explicit instructions which defined end points and the middle value (including examples) on a 9-point scale for each of several variables (21). The entire protocol was used to obtain a rating on each variable, but for some variables certain cards were more relevant than others and were given more emphasis.

Scales were constructed both to measure the structural qualities of the stories and to use them as expressions of inner needs, pressures, and attitudes. Variables involving story quality were plot construction, long-range planning, integrative ability, elaboration, and conceptual versatility. Those used to reflect needs and attitudes were need-achievement, security of relationships with men, security of relationships with women, self-assertiveness with men, self-assertiveness with women, outward-directed hostility and aggression, guilt, and eroticism. Anchoring points on the rating scales were derived from clinical experience with the cards and the scoring system.

Barnes (21) conducted a scoring reliability study and obtained intrascorer reliability coefficients ranging from .80 to .98. Interscorer reliabilities were not reported by Barnes but were a good bit lower (on the order of .40 to .60). Although these latter coefficients are not as high as would be ideally desired we consider it justifiable to present results so that they can be integrated with the other findings.

The scales, scoring criteria, and obtained scores are presented in tables III and IV. In general, story length was 90 to 100 words and reaction time from the presentation of the card to the beginning of the story was 20 to 35 seconds. These are gross indications of the approach to the task and are like the values commonly obtained with normal subjects (22). As would be expected for this well-functioning group, the mean scale values were in the middle range of the scores. The differences among

scales, though small, are consistent internally and in relation to the other tests. Figure 5 summarizes the data in graphic form.

The subjects were cooperative in taking the test and able to show some initiative. Stories were concise and straightforward, adequately planned and well integrated but not particularly creative or embellished. There was a generally high need for achievement reflected in the stories. Despite this, production was more "typically adequate" than elaborate or creative. The stories also reflected that the pilots reported relationships with men were somewhat warmer than with women; consonant with this, self-assertiveness with men was described as smoother and with a less compensatorily strong quality than those with women. Guilt and eroticism were expressed freely in response to appropriate story elements, and with neither avoidance nor overconcern. Aggressive feelings were higher than would be expected from the self-assertiveness scores, suggesting some unconscious preoccupation with feelings of this kind. A second-order inference, which can be derived from scores on story quality and inner life evaluated simultaneously, is that the modal pilot has the capacity to construct and integrate fantasies but has no particular interest in doing so.

Supplementary questionnaire

This questionnaire, outlined in a previous publication (5), was designed to investigate clinically significant issues not considered in the standardized test battery. Detailed descriptions of its evolution and format will be reported separately along with a comprehensive report of the pilot's responses to each question.⁴ For purposes of a modal description and without going into excessive detail, some indication of format and method of analysis will be helpful to the reader in interpreting the material that follows.

The questionnaire contains three types of questions: factual, self-rated, and narrative. Each is analyzed and reported differently. An-

swers to factual questions (such as age) are reported with a mean and standard deviation. Self-rated questions are reported according to the percentage of pilots choosing each point of the rating scale for every question. Unless otherwise indicated a 5-point scale was used. When appropriate, these results are reported with an indication of the question and phrasing of the particular scale (for instance: never, seldom, sometimes, frequently, or always). Analysis of narrative questions was more complicated. Answers to them were assigned to previously prepared categories by an independent rater. In the text the percentage of pilots choosing each category is reported for every question along with an indication of the question and categories of answers as well as samples of the narrative answers. Results of all three types of questions are integrated into paragraphs to arrive at modal description of significant issues in question. These results are grouped below into four major categories: emotional life, coping, current life-adjustment, and developmental history.

Emotional life

The MMPI and EPPS contain self-descriptive information about emotions but little in terms of the normal quality of a subject's typical emotional life. For this reason a long self-rated scale of the questionnaire queries the depth and range of emotionality while four narrative questions ask descriptions of situations that usually elicit emotionality.

Results indicated that the average pilot consciously experiences few strong negative affects. For instance, 90% said they seldom or never experience a sense of depression, guilt, or embarrassment; 70% seldom or never experience envy. Similar infrequency was reported for 17 of 19 items on a list of more subtle and physiologic signs of painful emotional excitation. Even the two items that were exceptions (butterflies in the stomach and boredom) were rated rare or absent by over 50% of the flyers. Considering the amount of emotional stimulation implicit in their life style these are all very low figures.

⁴A complete format will allow comparison of answers to individual questions by members of other populations tested. For instance, the prototype for our questionnaire was obtained from unpublished preliminary work done for a different study (23).

TABLE III
Structural qualities of the TAT stories: Scoring criteria, means, and standard deviations

Name of scale	Low (1-3)	Scoring criteria expected (4-6)	High (7-9)	Mean	S.D.
1. Plot construction; ability to follow test instructions.	Poor organization of past, present, and future.	Story has a past, present, and future but with poor relative weighting.	Good organization.	5.2	2.6
2. Long-range planning structural qualities of the story; evidence of goal-directed behavior.	Endings ambiguous; plot developed on an immediate associational basis.	Planning is present but short-range; limited consideration of cause and effect.	Conclusion is logically developed and reference long-range outcomes.	5.2	2.6
3. Integrative ability; integration of specifics into a meaningful whole.	Poorly organized, unmeaningful stories.	Fairly well integrated stories, but short and without transitions. Outcome may not be fully resolved.	Well-developed, well-resolved stories.	5.7	2.0
4. Elaboration; verbosity.	Stories which are brief, terse, static, unelaborated.	Stories of average length; content not limited to non-adjectival descriptions.	Highly embellished stories.	4.8	2.4
5. Conceptual versatility-creativity.	Stimulus-bound, concretistic accommodative stories.	Stories which are commonplace, expected, card-oriented, but with some generalization of stimuli.	Assimilative stories breaking through the stimuli toward creativity.	5.3	2.4

TABLE IV
Expressed needs and attitudes in the TAT stories: Scoring criteria, means, and standard deviations

Name of scale	Low (1-3)	Scoring criteria expected (4-6)	High (7-9)	Mean	S.D.
1 Need-achievement; expressed needs for mastery, status, and ambition	Stories contain no stated goals or ambitions, no needs for mastery.	Willingness to cope with exigencies, and to work for some moderate achievement.	Stories express ambition and a strong need to achieve at a high level.	6.3	2.1
2 Security of relationships; feelings of warmth, comfort, and trust— a. With men b. With women	Stories indicate a distant relationship; discomfort, insecurity, hostility, or inconsistency.	Impersonal matters are being discussed, without either strong animosity or friendship, though some warmth based on past relationships may be expressed.	Stories indicate feelings of closeness, warmth, trust, comfort, and show an ability to make a firm commitment to others.	5.9 4.1	2.0 2.5
3 Self-assertiveness, feelings of dependency, independence, and defiance— a. With men b. With women	Subject seeks and accepts external direction; characters are ambivalent; subject is passive with men, defers to wishes and decisions of women.	Subject accepts responsibility, makes decisions, participates on the basis of mutual acceptability.	Subject is dogmatic and independent, dominates the situation, refuses assistance, rejects solutions mutually acceptable.	4.8 5.8	1.8 1.8
4 Outward-directed hostile aggression.	Passive, nonhostile themes, even where picture suggests aggression; denial of hostility.	Mention of hostile aggression where picture suggests it; aggression not intense.	High incidence of aggression in their protocol; intensification of aggression where suggested by the picture; definite sadistic elements.	6.2	2.3
5 Guilt, feelings of remorse	No reference to guilt or remorse is made.	A reasonable amount of guilt is expressed where the picture suggests it is appropriate; handled rationally; not exaggerated.	Feelings of overwhelming guilt and remorse are expressed.	5.0	2.4
6 Eroticism	Denial of erotic themes.	Casual handling of pictures containing erotic stimuli, without denial or exaggeration.	Overt exaggeration of erotic themes.	4.9	2.1

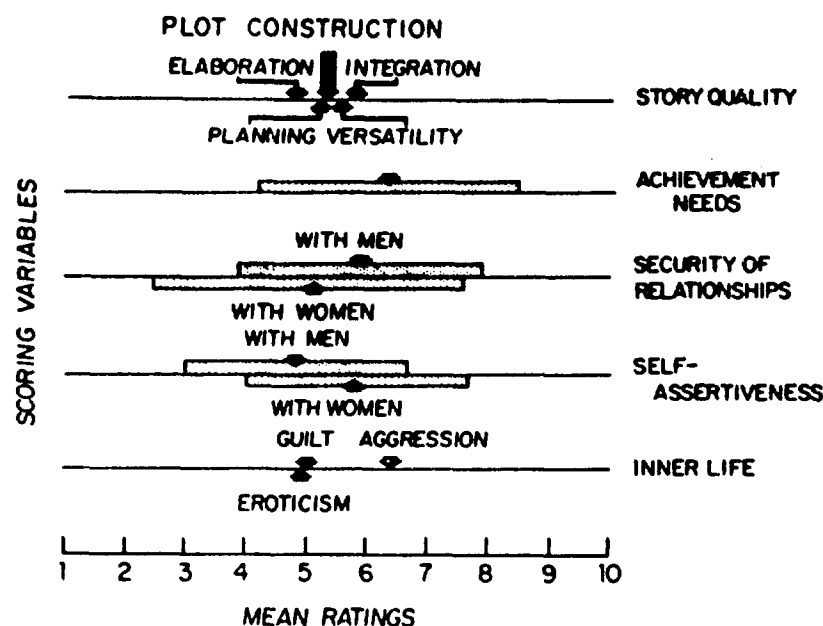


FIGURE 5

Integrative summary of average scores on the Thematic Apperception Test special scales.

Narrative questions asked about usual reasons for two of these negative affects, depression and anxiety. The most frequent reasons reported for depression involved failure to accomplish a goal (30% of responses) or a disappointed expectation (30%). Family and interpersonal problems were described only 12% of the time and intrapsychic problems never. Similarly, alloplastic reasons were given for anxiety: a new or exciting situation (28%), a situation demanding achievement (26%), and a frustration (20%). Only 16% described an interpersonal situation as a usual cause for anxiety. The third narrative question asked for a description of the worst life-crisis. Again most (46%) described a straightforward practical educational or vocational problem—for instance, "I didn't get appointed to the academy" or "poor grades in college"; 12% cited the death of a parent. Crisis described in personal or emotional terms such as "I got a girl pregnant," "a dear John

letter," or "alone" were relatively infrequent (18%). Only 8% described any kind of crisis involving close family members short of parental death.

Elation and excitement were experienced more frequently than negative emotions but not as often as might have been predicted from the pilot's way of life: 10% infrequently experienced these emotions; 60% sometimes experienced them; while 30% reported them as frequent or very frequent. The fourth narrative question asked, "What was the best thing that ever happened to you?" Answers were not dramatic. The most frequent category of response related to marriage and family life (40%); 26% cited their vocation; 22%, an educational opportunity.

In summary, negative affects of all sorts were reported as rarely experienced, and when experienced were usually reactive to prosaic,

practical alloplastic situations. Positive emotions, while more frequent, were also not reported as intense or extreme.

Coping

Typical ways of coping with emotionally significant situations are not comprehensively measured in a traditional psychologic test battery. For this reason the supplementary questionnaire included a checklist and four narrative questions concerning coping.

Figure 6 shows modal results of the checklist. When nervous, angry, or depressed most said they tended to seek constructive solutions or speak out and directly defend their position; less frequently, ignore the situation and attend to work, joke, or argue; and rarely, fight physically, withdraw, brood, blame others, hold back, become tearful, or act childish. This approach is characteristically alloplastic and direct; it indicates control over impulsive behavior and a paucity of introspection.

Illustrations from the narrative questions add some flavor to these answers. Three separate questions were asked about coping with anxiety, depression, or anger. Answers and distribution of answers for the three were similar. Answers to the question about anxiety are used as an example. The most common category of response again was seeking a direct alloplastic constructive solution (32%). This was expressed in terms such as "press on," "work harder," "alter the situation," or "do something constructive." Emotional avoidance was common (22%); for example: "forget it," "don't think about it," "live with it." Physical avoidance ("enjoy life," "busy myself," "do something else") was described by another 14%. A sizable minority reported they would seek a constructive auto-plastic, usually cognitive solution (22%)—for instance, "try to remember everything," "reassure myself," "understand the new situation," or "free myself to be calm." The fourth narrative question in this section asked the flyers to state how they overcame the worst life-crisis

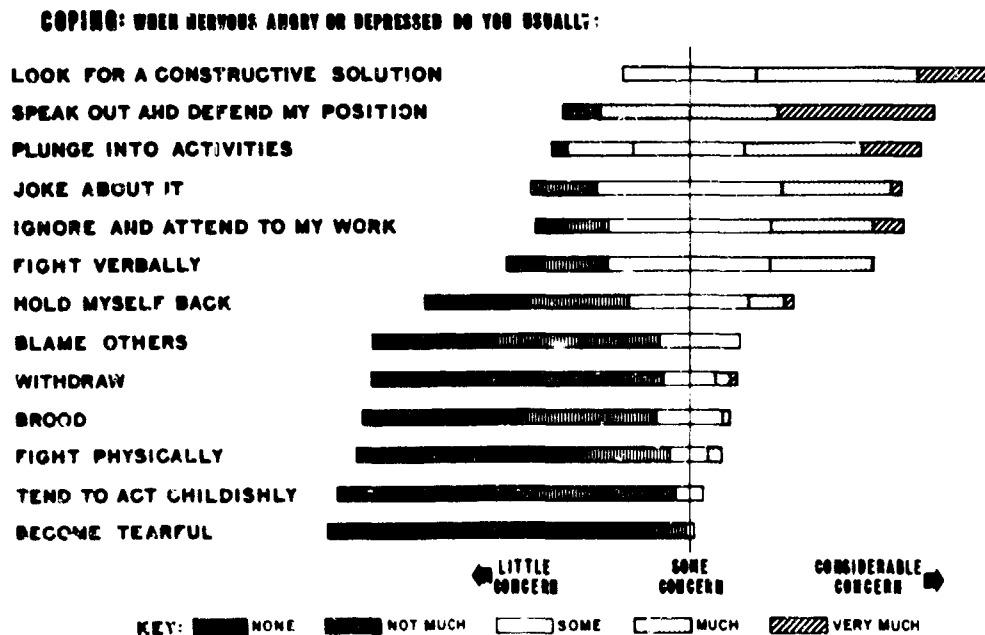


FIGURE 6

Summary of responses on coping behavior.

described in the previous section. Responses again were typically alloplastic and calm: 30% described a head-on mastery of the problem; 28% said they tended to "forget it"; 20% described a passive waiting approach. Only 12% described an intellectual or introspective solution; 10% described some indirect way of circumventing the problem; 28% did not respond.

Current life adjustment

Most of the prosaic facts of the pilot's current life situation are dictated by the facts of military life. In studies on aircrew morale and personnel management, Cantrell and Hartman (24) have shown that nonduty factors such as pay, housing, and geographical area of assignment are sources of low-level concern. In contrast, on-the-job factors like the stability and predictability of time at home, the amount of time away from home, recognition and status, and the effectiveness of various support groups such as maintenance are leading areas of concern. From our point of view it is noteworthy that the aircrewmembers reported these areas of concern in a matter-of-fact manner, minimizing the impact of such factors upon themselves and expressing more satisfaction with their jobs than would be expected. Our supplementary questionnaire concentrated on getting as much emotionally unloaded personal material as possible and on exploring situational factors usually considered clinically significant and not tapped by the psychologic test battery.

Personal information

The average pilot in the sample studied was 28 years old (mean, 27.9; S.D., 2.9), white (100%) Protestant (66% Protestant, 22% Catholic, 2% Jewish). Modally he was married (78% married, 20% single, and 2% divorced) and had two children.

Physical findings

Evaluations of physical fitness were done with a fine-tooth comb. No pathologic physical findings were observed in 40% of the men; the remainder had a variety of physical findings—none of which were serious enough to warrant

grounding. These findings were: deflection of nasal septum (found in 16% of the flyers), strabismus or other minor convergence problems (10%), cysts and polyps of the nose and sinuses (8%), vascular hyperactivity (8%), suspected early cataract (6%), sinusitis (4%), unclassified interventricular conduction defect (4%), nonspecific ECG T-wave changes (4%), hemorrhoids (4%), varicocele (4%), spina bifida occulta on x-ray (4%), congenital anomalies of lumbosacral region (4%), congenital anomalies of lumbosacral region (4%), Wolff-Parkinson-White syndrome (2%), nonspecific gastrointestinal complaints (2%), degenerative joint disease of spine on x-ray (2%), and asymptomatic hyperbilirubinemia (2%).

The average married flyer had been married at age 23 (mean, 22.8; S. D., 2.13). Marital adjustment was typically described as good. The group was asked to rate their wives as companions, sexual partners, and mothers: 94% rated their wives as "excellent" or "good" companions; 100% rated sexual life in the marriage as excellent or good; 92% said their wives were excellent or good mothers.

Answers to three other questions substantiated the claim to a satisfactory sexual adjustment: the group described average frequency of intercourse as three times a week (mean, 2.96; S.D., 1.67); 82% denied any extramarital affairs. All who had had extramarital affairs described them as casual. The claim to companionship in marriage also seemed to hold up. For instance, in response to a narrative question which asked what the couple would typically quarrel about, 20% said they never quarreled, 33% occasionally quarreled usually over finances, and only 23% described personality differences; 24% did not respond. To add to the impression of a satisfactory marriage, role-definition was described as clear. In 83% of the families the husband managed the finances; in 5% both managed the finances. Discipline of the children was about evenly divided (33% "myself," 34% "my wife," and 32% "both"). Couples came from the same religious denomination in 93% of cases, and 84% of the households practiced the same religion as the paternal grandparents.

The only fly in this marital ointment was a hint that the relationship, though compatible, modally tended toward distance. For instance, when asked what they like most about their wives, 57% described somewhat impersonal virtues in objective terms such as "character," "looks," or "broad interests," and 9% named compatibility. A sizable minority (34%) described their wives as loving or understanding. When asked what they like least about their wives, 37% described a strong-minded personality trait such as "stubborn," "short tempered," "impatient," "too independent," or "hard to convince"; 33% described passivity or unreliability in terms such as "gives up too easily" or "disorganized." Only 2% said they had different interests; 15% described relatively impersonal faults such as "her family."

Almost all the flyers refused to answer a question that asked which child they liked best and why.

Career

The average flyer in this group was a regular in the Air Force, (80%), a captain (56%) or first lieutenant (44%), and on active duty 6 years (mean, 6.3; S.D., 2.95). The group was about evenly divided among bomber (28%), transport (36%), and fighter pilots (36%). On the average they had had 16 years of formal schooling (mean, 15.7; S.D., 1.0) usually with a bachelor's degree in engineering.

When asked what they like best about their career in the Air Force, most cited flying (36%) or a sense of achievement (36%). Only 8% described excitement. Relatively few described the military way of life (8%) or opportunities for travel and pay (12%). Another question asked what they liked most about flying: 62% described a sense of mastery, achievement, or competence—for instance, "precision" or "control of the machine." More direct pleasure or excitement was described by 26%. This was put in such terms as "speed," "scenery," and "free movement."

In summary, the average flyer's current life-adjustment emphasized a satisfying family

life. Marital life was compatible and sexually typical (26) but with some hint of interpersonal distance. Career interests centered around achievement of competence in flying rather than impulsivity, raw pleasure, or advancement in the organization.

Developmental history

One sphere of information considered of prime importance by clinicians but not included in the standardized test battery concerns the developmental history. We are aware of distortions implicit in retrospective descriptions, yet believe that these questions round out a picture of the subject's personality, give some indication of cyclicity in personal experiences and at least some significant information directly related to background. This section includes descriptions of the general emotional climate in the flyer's family during his childhood, his mother and his father, and memories of various developmental phases.

Emotional climate during childhood

The average pilot from the group studied was raised as part of an intact middle class family in a city of less than 50,000 (64%) and from no particular section of the country. Relatively few were raised in a big city (under 20%). Few (28%) came from non-nuclear families. Most had 2 or 3 siblings. Almost all (90%) had at least one younger sibling. Most (64%) also had at least one older sibling.

The most direct approach to inquiring about the quality of the early emotional climate was with a narrative question, "What was the nicest thing about your home life?" (at age 10): 40% of the group described family stability. This was couched in terms such as "family togetherness," "the stability of a close knit family," or "relatives lived nearby and we visited back and forth." Another 16% also described stability, only in more empathic terms such as "understanding," "they loved us yet allowed independence," and "mutual trust and confidence." Somewhat more vague but also family-related security factors—such as "Sunday breakfast," "country life," "financial

security," and a "clean neat home"—were given by 14%; 16% described how members of the family did things together; only 12% described a more personal factor such as "freedom to make my own decisions," "being able to do as I wanted," or "I enjoyed the freedom of the farm."

The next step was to follow up this emphasis on a stable home life with more qualitative description of family ideals and concerns. Family ideals were queried on a list of four items each requiring a "yes" or "no" answer. Responsibility was checked by most (62%), "contentment" by a large minority (42%), money by only 10%, and fame by almost none (4%). Areas of family interest were checked off on a list using the usual 5-point scale. Results are shown in figure 7. Most consistently the families concerned themselves with manners, respect for elders, work, discipline, and responsibility. Concerns were not narrow. Intermediary fac

independence, sports, health, religion, and orderliness. Potentially conflicted situations—such as drinking, staying out late, and moral behavior—were not stressed. There was a relative emphasis on getting along with groups, and a marked family de-emphasis on family discussions and avoidance of sexual matters. We were surprised to find that the pilots rated mechanical interests as of only moderate interest in their families of origin.

Apparent harmony reigned in these families. A 10-item checklist queried areas of parental agreement or disagreement. More than 94% of respondents recalled that their parents frequently or always agreed on moral matters (99%), finances (98%), division of responsibilities (98%), and discipline for the children (94%). Parental agreement was also modally "frequent" or "always" with regard to social life (74%) and intellectual matters (72%). No areas of parental disagreement were modally reported for any of the remaining items:

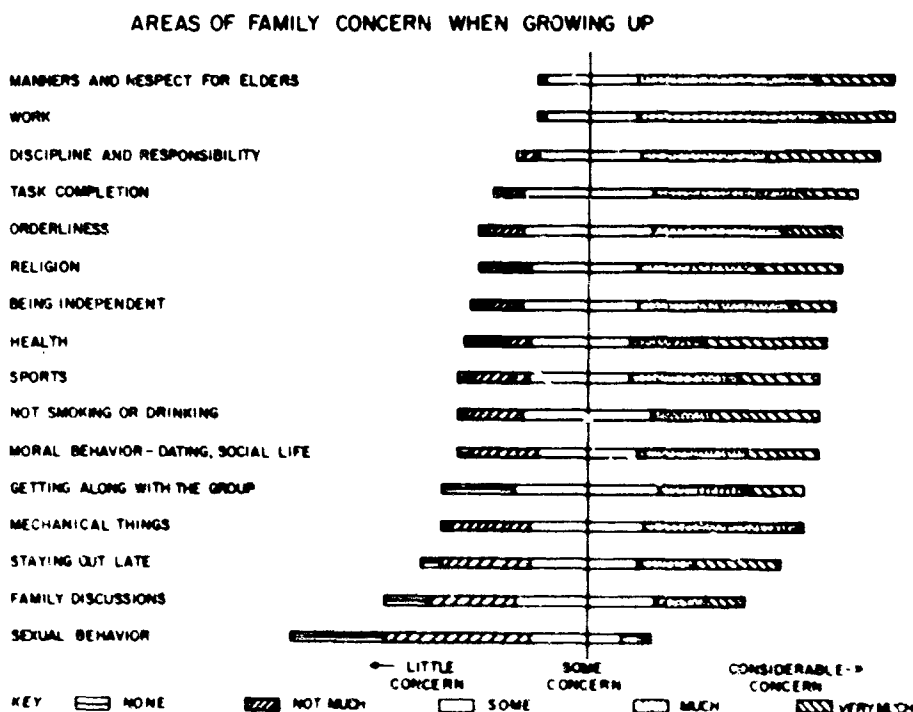


FIGURE 7
Summary of responses on areas of family concern.

intellectual matters, scholastic achievement, athletic and manual ability, and the children's future career.

Home life was modally reported as being happy: 88% reported "much" or "very much" happiness on the 5-point scale. Most said they got along "well" or "very well" with their parents (84%).

Another set of questions concerned the family's mode of expression of affection and discipline. Parents were described as not physically affectionate to children (32% "not much" or "none" and 44% "some"). Rather, they liked to do things with the children as a family (70% reported "much" or "very much") or with each other as a couple (62% reported "much" or "very much"). Methods for discipline were queried on a list asking for "yes" or "no" answers. The most frequently checked methods were scolding by mother (96%) or father (86%) and physical measures by mother (76%) or father (74%). Physical restrictions were used less frequently (66% by father and 60% by mother). Withholding of love was perceived as a very unusual method for discipline (only 2% responded "yes" for father and 6%, for mother).

One other narrative-type question was asked to get at what we assumed would be some of the negatives of family life. Answers were mostly neutral or mildly negative. In response to "If you could have, what would you have changed most about your home life?", 28% marked "nothing" and 22% used emotionally neutral phrases such as "living in a bigger neighborhood" or a "more intellectual environment." Most of the remainder mentioned some kind of physical or emotional limitation to family interactions; 18% described this in terms of distance such as "happier parents," "closer family ties," or "being more friendly with my brother"; 14% described how father worked too hard or was away on business; 12% described a lack of understanding on the part of the parents. This was put in terms such as "poor parents-child relationships," "my father didn't like my sister," or "mother wasn't affectionate." Only

6% described personal limitations such as "I should have done more for my parents" or "being too big to play football." Parental divorce (8%), separations (4%), or early deaths (4%) were not common.

In summary, the characteristic early emotional climate was one of family-core, American stability, and middle-class Protestant virtues. The family was self-contained, well-functioning, and matter-of-fact. Relationships seem to have been carried on through effectiveness rather than with emotionality or by means of discussions.

Description of mother and father

Since these flyers had been raised in nuclear middle-class families, descriptions of their parents and relationships with their parents were considered particularly important. Pilots rated word descriptions of each parent on two scales. Other self-rated and narrative questions supplemented the scales. Descriptions of the modal mother and father, of typical relationships with them, and a comparison between them have been constructed.

1. *Mother.* The average flyer's mother was a homemaker (70%) with no outside job. A minority of mothers had training in a profession such as education or nursing (12%) or with less skilled work such as bookkeeping or as a beautician (8%). A small minority (6%) did factory work. Figure 8 illustrates the modal word description of mother, as well as the father, whose profile will be discussed later. In general, mother was seen as fairly encouraging, sympathetic, warm and close—but less rewarding and relaxed. She was neither permissive nor easy to figure out. Another question rated on the usual 5-point scale asked how strict mother's discipline was during childhood: 56% rated it as strict or very strict (the highest 2 points on the scale) and only 6% rated the mother as lenient. Narrative questions asked for descriptions of mother's best and worst traits. Answers to these questions also tended to confirm the profile in figure 8. Most (72%) described their mother's best trait in terms of empathy such as "understanding."

"patient," "kind," "loving," "gentle," "cheerful," "unselfish," and "sincere." Another 12% described mother's best trait in terms of devotion to the home or pride in the family. A few (14%) described colder, more objectified virtues such as "honest," "intelligent," "a good cook," "a hard worker," or "versatile." One refused to describe any good qualities.

With regard to the worst trait, judgment was lenient. The most common category of bad traits was a poor disposition (36%). This was described in terms of "nagged," "talked too much," "temper," "overmoralistic," "loud," "stubborn," or "domineering." Another 20% described every symptom of nervousness or internal tension. A minority (20%) described passive traits such as "weak-willed," "gullible," or "too kind to me"; 16% found no fault with their mothers, and 8% resorted to a description of relatively impersonal traits such as "she smoked."

A description of the pilot's personal relationship with his mother during childhood was obtained from self-rated questions scattered throughout the questionnaire. The average pilot said he got along very well with his mother (56% rated "excellently" or "very well" on a 5-point scale), and received much affection from her throughout his childhood (72% checked "much" or "very much" on the 5-point scale). In fact, a majority (56%) recalled that they were their mother's favorite child; however, this did not lead to an overbearing relationship. In answers to a question dealing with this, 80% reported that they were accepted "casually"; 20% said they were treated as "very important." None felt rejected.

2. *Father.* The typical father was a blue-collar worker (32%) such as welder, electrician, steel worker, or one who did heavy outdoor work (16%) such as forestry, farming, or mining; 26% of the fathers were in a

RATING SCALE

ENCOURAGING
PERMISSIVE
REWARDING
SYMPATHETIC
WARM
CLOSE
ACTIVE
RELAXED
CONSISTENT
ATTRACTIVE
EASY TO FIGURE OUT

MEAN RATINGS

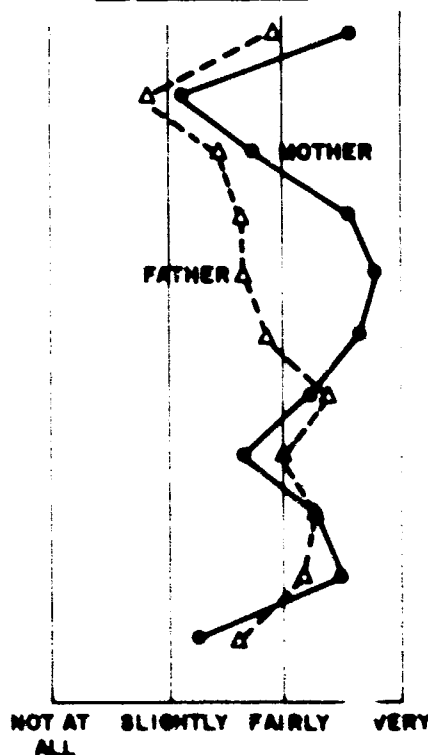


FIGURE 8

Profiles summarizing descriptions of father and mother.

managerial position in a small business—for instance, as laundry manager, sales manager, or trucking contractor. Among the fathers, 16% had white-collar or clerical jobs such as a post office or railroad clerk or as an Armed Forces enlisted man; only 10% were in professional or high-level managerial positions such as minister, teacher, engineer, banker, or Armed Forces officer. Reference to figure 8 shows that the father was modally perceived as being predominantly active and consistent, less rewarding, encouraging, sympathetic, warm, close, and easy to figure out, and not at all permissive.

Narrative questions asked about father's best and worst traits. As shown on scale in figure 8, most (58%) described him in respectful but somewhat distant terms, such as "a hard worker," "honesty," "common sense," "a good speaker," "self-confident," or more loving but still objectified adjectives such as "good-hearted," "fair," "patient," "understanding," and "calm" (28%). Only 10% described their father's best trait in terms of love or affection for members of the family; 4% could describe no good traits. The most common category for a description of the worst trait was of harshness of personality such as "temper," "stubborn," "intolerant," "inconsiderate," "suspicious," "impatient," or "boastful" (42%). Another 12% described nervousness in such terms as "a worrier" or "drank too much." Emotional or physical absence was identified by 18%; for instance, "He loved money more than mother." Passivity was mentioned by 12%, and 16% specified impersonal defects such as "too poor" or "lack of education." Answers to two other questions add to this stern impression. On scales of affection and discipline the modal father was perceived as only fairly affectionate (34% reported "much" or "very much," 44% reported "fairly," and 24% reported "not much" or "not at all") and a strict disciplinarian (66% reported "strict" or "very strict").

Despite this somewhat harsh personality description the group said they typically get along well with their fathers (60% said "well" or "exceptionally well"). In fact, most (54%)

thought they were father's favorite child. They felt casually accepted (54%) or "very important" (40%) and rarely rejected (20%).

3. *Comparison of mother and father.* A comparison of the modal description of mother and father indicates that the mother predominated in affectional qualities while father was seen as slightly more authoritarian, relaxed, and easy to figure out. This graphic comparison is inherent in figure 8.^a Consistent with these descriptions were the average flyer's memories of childhood confidence and of affection. For instance, when I asked in whom, within the family, they could most easily confide, 48% singled out mother; 18% said father; 16%, both or all; 2%, a brother, and 16% "no one." Also, when asked "who in the family were you most fond of?", 34% said mother; 20%, father; 22%, both or all; 16%, a brother, sister, or relative; and 8% refused a choice. However, with regard to identification, 62% said they take more after their father; 24%, after their mother; 10% said they take after neither, and 4% both.

Developmental phases

Many of the questions in the supplementary questionnaire specified recall from definite periods in the flyer's life. Answers to these questions have been organized into descriptions of three 6-year periods: early childhood, school years, and adolescence.

Early childhood. There is good agreement among clinicians that stability and consistency are crucial factors in the earliest years. For this reason questions about this period focused on these factors. The average pilot lived his first 6 years between the years 1936 and 1942 during the late depression and World War II; 20% of the respondents said that during these years their fathers were away for long periods of time for business reasons. Another 6% reported that their parents were either separated or divorced. Changes of residence were modal (see figure 9). Between birth and 3 years,

^aWe used Grinker's (28) double rating method and reduced the double profile to a single curve by plotting the adjusted sums of the differences.

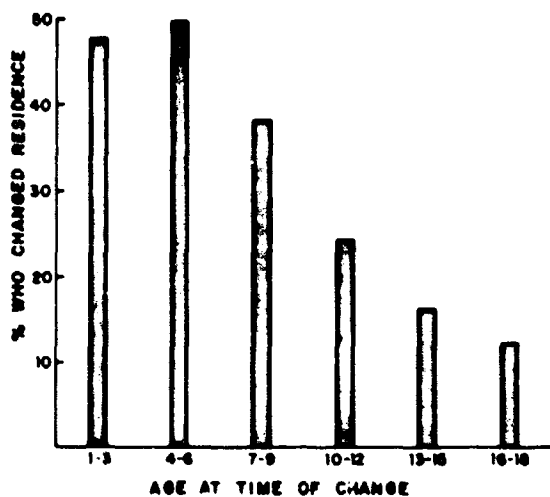


FIGURE 9

Summary of number of changes in residence during childhood.

48% changed residence at least once; between ages 3 and 6 years, 50% changed at least once. Despite these potential sources of instability, the vast majority (88%) rated "not much" or "none," the lowest 2 points in response to a question which asked if there was turmoil during the earliest years. Parental deaths during childhood were rare (4%). None of the pilots suffered from serious or chronic illness. None recalled thumbsucking, bedwetting, or other neurotic symptoms.

A narrative question asked for the age and content of the earliest childhood memory. We regarded this as a screen memory, most likely the reflection of attitude or life style. Answers were rated to see if they were personal or impersonal as a reflection of object relationships, active or passive as a reflection of mastery, and pleasurable or unpleasurable as a reflection of outlook. Responses predominantly personal (80%), active (58%), and pleasurable (58%). The average age for the earliest memory was 3½ years. Further breakdown conveys their flavor. A plurality of these memories (30%) were pleasurable, personal, and active; for instance, "fishing at a lake," "earning enough to buy a toy truck," and "we played an April

fool joke on the teacher"; 16% reported personal, pleasurable, passive memories such as "waiting for Dad to come home" or "watching a football game"; 20% recalled personal, active, and unpleasant memories such as "I caught a big fish and fell out of the boat," "falling out of a car and running after it," "I fell in school and cut my lip"; 14% reported personal, passive, and unpleasant memories such as "getting a checkup by the doctor" or "I dreamed there was a tiger in my crib"; 8% recalled nonpersonal active memories—"my mother pushing my sister in a stroller," "my uncle playing tennis"; 6% had nonpersonal passive memories such as "my brother was stung by a bee"; 6% did not respond to the question.

In summary, during the earliest years, pilots typically recalled geographical moves but no personal turmoil.

Elementary school years. The elementary school years have been described as the time when, given a stable environment, a child absorbs his culture's technology (27). For this reason our questions about this phase concentrated on the presence or absence of stability and the flyer's recall of range of interests and quality of performance.

Personal stability was described as modal for these war years (1942-1948). None of the flyers suffered from a serious or chronic illness. Parental separations or divorces were rare (4%). As shown in figure 9, change of residence was recalled as less frequent than in the previous 6 years but still not unusual. Most recalled themselves as having been of average size (52%) and agility (58%). A larger proportion considered themselves outstandingly agile (42%) than outstandingly large (24%). A large majority recalled that they enjoyed school (84%), did well academically (90%), and were never suspended (98%). By and large, they reported getting along better with brothers, older or younger, than sisters.

A checklist rated on 5-point scale was used to query the typical range of interests during elementary school years. The most outstanding interests were participant sports (checked

"much" or "very much" by 80%) and boys' clubs (60% checked "much" or "very much"). However, interests were not undiversified. The majority had at least "some" interest in music (68%), reading fiction (66%), solitary contemplation (86%), and observer sports (88%). Most had a hobby (80%). Favorite hobbies were building airplane models (32%), organized sports (14%), hunting and fishing (12%), and more sedentary activities such as reading, photography, music, and art (16%). Recall of the favorite book at this age confirmed the impression of a "square," nonintellectual boyhood: 32% described a fictional adventure such as the "Hardy Boys" or "Swiss Family Robinson"; 16% favored a nonfiction adventure book such as "Kon-Tiki"; 6% recalled a biography such as "Abe Lincoln" or "Babe Ruth"; 8% recalled informative nonfiction such as the "Encyclopedia," or "World War II Fighter Aircraft"; 38% could not recall a favorite book. A buddy during preadolescence has been described as important for normal development (28): 82% of the flyers reported that between ages 10 and 12 they had a best buddy. The most usual activity with this friend was sports.

In summary, during the latency years the flyers modally recalled personal stability and good school performance. There was a typical boyhood interest in adventure, sports, and groups. Interests were diversified but predominantly nonintellectual.

Adolescence. Independence and sexuality have been described as the two developmental tasks of adolescence. The questionnaire included questions touching on these two issues and how much turmoil attended them.

Modally no personal turmoil was reported for adolescence (58% reported "none"). Of those who admitted to turmoil, most (28% of the total) described an internal state such as shyness. Only 6% described interpersonal problems. No delinquency was reported. There were also no serious illnesses and no loss of parents through death or divorce. As shown in figure 9 changes in residence were much less frequent than during earlier years.

Personal progress toward independence was diversified. This can be seen from results of a self-rated scale of activities during adolescence. Almost all the flyers frequently (90% "always" or "frequently") engaged in activities with a group of boys their own age. Activities usually involved a formal athletic team (90% "always" or "frequently"). However, most also reported at least some interest in intellectual competition (82% "always," "frequently," or "some"), solitary activities (66%), and even daydreaming (74%). The group tended toward leadership. They were at least "sometimes" leaders in social activities, a work or study group (80% reported "always," "frequently," or "sometimes" on a 5-point scale). Only 4% said that their suggestions in social groups were "rarely" or "never" accepted.

Flying became of major conscious interest during adolescence at age 14 (mean, 14.36; S.D., 4.84). Most recalled thinking flying would be exciting or thrilling (64%). Only 18% fantasied at that time that flying would result in increased competence or achievement.

Sexual experience was consistent with an average middle class population (26). Masturbation was recalled to have started at 13 (mean, 12.9; S.D., 3.96). The average age for the first formal date for 13½ (mean, 13.52; S.D., 2.65). Heterosexual experiences were not precocious; necking at 14½ (mean, 14.6; S.D., 1.97) and first intercourse at 18 (mean, 18.2; S.D., 3.46). Premarital sexual experiences were usually with a girl with whom the subject was emotionally close (70%) and rarely with a casual acquaintance (13%) or prostitute (4%).

In summary, there was little adolescent turmoil and no clash with society during the adolescent years. The average pilot was accepted by his peer group, and particularly interested in but not preoccupied with sports. Experience with sex proceeded without indications of conflict and preceded a conscious interest in flying.

IV. INTEGRATION OF THE DATA

Our results can be integrated in five major findings. Each is listed then followed by a

discussion. These discussions cite data to justify the conclusion, then consider theoretical or practical significance. More leeway will be taken in this discussion than in reporting results.

1. Military pilots represent a specific segment of modern American society—they have enough personality characteristics in common to justify modal analysis. This study allowed construction of a modal personality picture since results were both reliable and internally consistent.

Frequency distributions for most of the numerous questions and scales used in the evaluation were homogeneous enough to allow construction of a balanced modal personality picture. Indeed, results were so uniform that we abandoned the idea of further formalized statistical studies, such as factor analysis. We speculate that rigid screening in several steps of job selection and performance along with opportunities for social mobility implicit in our society resulted in the "natural selection" of this homogeneous group. In other words the choice of and success in a career as military flyer sorted a particular personality type from the general population.

All examiners recorded clinical impressions that these 50 flyers were cooperative and responsible in their approach to individual tests and responded to them without reservation in a style natural to them. These clinical impressions were supported by scores on several formal scales. Internal consistency measures were high on the MMPI and EPPS. "Lie" and "plus getting" (painting an unrealistically positive picture) scales were both low on the MMPI. Measures of total wordage and reaction time on the TAT were typical. Unconscious distortions as reflected by the projective tests were minimal.

2. By most standards the modal pilot is psychiatrically normal. Psychopathology is not the main motivation for his life style.

We arrived at this conclusion after comparing our results with a comprehensive review of

psychiatric normality by Offer and Sabshin (29). These authors grouped definitions of emotional normality into four general perspectives: "health" or a reasonable lack of psychopathology, "average" or conformity to statistical norms, "process" or overall success in lifelong adaptation, and "Utopia" or approximation to an optimal or ideal standard. Offer and Sabshin concluded that from a scientific point of view, closure of theory is premature; it should await empirical evidence. For this reason we shall consider the flyer's normality in light of available evidence from each perspective list above.

Psychiatric "illness" was prominently lacking. Rated flyers have to meet rigid physical and emotional standards on yearly flight physicals. The mere fact that these men remained on flying status and had been chosen for a normative study indicates a lack of overt physical or emotional pathology. During evaluation at the School, and after demanding, diverse physical stress tests, none of the 50 pilots were screened out by any of the various specialized physicians and psychologists with whom they came in contact. More specifically, on various symptom checklists and tests they described a lack of serious negative affects, neurotic or psychosomatic symptoms, psychosexual fixation, and bizarreness in actions or fantasy life. Capacity to relate to other people, control impulses, defend against anxiety, evaluate reality, integrate perceptions, and execute actions was intact. There were no serious adjustment problems in work, love, or play.

Conformity to "average" norms on psychology tests was also excellent. Not one of the flyers deviated from acceptable norms on any scale of the MMPI. Special scales on the MMPI were high for ego-strength and low for emotional immaturity. Results on psychomotor, intelligence, and projective tests were also generally within limits accepted as normal. What deviance existed, particularly on the projective tests, was not extreme and will be discussed as a trend in personality balance rather than a sign of psychopathology.

Normality as "process" also was modally adequate. Here we are limited by retrospective

data; however, indications are that, as a group, these flyers have maintained an internally consistent and appropriate adaptation throughout their lives. They typically have a background of family stability, reasonably good parent-child relationship, good physical health, lack of personal turmoil or psychiatric symptoms, good performance at school, no significant problems with authority, social acceptance by peers, an unconflicted sexual history, and lack of serious adolescent turmoil. Their type of work does not vary grossly from that of their fathers in the sociologic sense. Their families function much as did their parents'.

Only when normality is discussed as "Utopia" does this group fail to approach a standard—perhaps optimal personality functioning for pilots is more appropriately discussed with relationship to astronauts, who usually are test pilots chosen from the cream of the cream of military flyers. Korchin (30) and Ruff (31), who studied the original group of Mercury astronauts described backgrounds, needs, values, and coping techniques that bear a striking similarity to those of ordinary flyers. Differences were pronounced only with respect to endowment and success in life experiences. In other words, astronauts share patterns in personality balance with other American flyers but are more capable of transcending the typical pattern. This group of typical flyers tends to highlight assets and liabilities of the balance: areas where adaptation and growth or maladaptation and symptoms can most predictably be expected.

3. These men have a personality pattern in common. The typical personality is characterized by an alloplastic approach to the world, matter-of-fact, terse direct ways of coping, strong needs for personal achievement, and high regard for responsibilities and family life. Complexity is added by sublimated needs for novelty and by emotional distance in interpersonal relationships. Relationships with men tend to be unemotional and smooth. Relationships with women function smoothly when distant but result in unconscious anxiety when forced. Unconscious aggressive hostility exceeds amounts that are ego-syntonic. Internal tensions exist and seem related to this

hostility as well as frustrated achievement needs, a strong sense of responsibility in the face of needs for novelty, and distance in relationships. Inner tensions are reflected in two areas of personality vulnerability: (1) a potential to act out when frustrated, and (2) characterologic reductions in efficiency. Reductions in efficiency affect personally important areas such as productivity, contentment, and self-acceptance and less valued capacities such as intellectual achievement, creativity, and emotional expression. Assets that typically compensate for these vulnerabilities are ego-strength, consistency of patterns, good endowment, a sense of self-sufficiency, courage and dominance, and life-long success in alloplastic pursuits.

We arrived at this word picture by listing results from various measures, then combining them. Data that lead to each conclusion are described and expanded below. A formulation by White (33) was helpful in conceptualizing these results. White comprehensively reviewed the empirical basis for a wide range of theories of motivation, noted much data that could not parsimoniously fit into drive reduction theories, and suggested "competence" as an additional primary motivation. He noted that needs for curiosity, novelty, excitement, and manipulation move immature organisms to transact with their environments. Ideally, this transaction results in effective mastery and competence. White understood that strongly aroused drives, pain, or anxiety can override effectant motivations and turn the organism inward. Optimal stimulation in both drive and effectance areas leads to mastery over the appropriate environment and inner states. Adult psychology reflects a structuralization of both drive-derived and competence-motivated experiences. Adult homeostasis results from these structuralized skills. In light of White's formulation it appears that pilots have an adaptation resulting from a relative emphasis on competence, with outstanding abilities to master environments. However, insulation from and relative lack of mastery over drives, with compensatory avoidance mechanisms, lead to adult vulnerability in drive areas.

The alloplastic orientation to needs and coping came through most clearly on the projective tests and supplementary questionnaire. These tests indicated that the group was more dependent on external than internal stimuli for projective test responses, very sensitive to the needs of others, less sensitive to self needs, very interested in the environment, and capable of but not particularly interested in fantasy life. Typical technics for coping were self-sufficient, concise, straightforward, commonplace, and matter-of-fact; not regressive, rarely consciously avoidant, particularly with respect to situations, but sometimes unconsciously avoidant with respect to inner emotional life or personality issues.

From a psychiatric point of view it may be important to stress this general tendency to cope with situations and emotions by devoting efforts toward stimuli rather than by introspection. Emotional self-analysis is not particularly ego-syntonic, and empathic self-analysis with someone else's help definitely is not. Two scales on the EPPS indicated that the group typically considers it very undesirable for adults to either seek care or care for others. This is not to say that other more casual performance-oriented forms of self-analysis are not utilized or that the group is typically incapable of emotional introspection. Indeed, one EPPS scale indicated they thought it *desirable* to introspect. Rorschach and MMPI results indicated a functionally adequate self-awareness; however, despite this the flyer's general preference remains an alloplastic, emotionally casual, performance-oriented, direct approach.

These alloplastic patterns are not a mere superficial adaptation to military life. They were described as lifelong. For instance, when he was growing up, the typical pilot's parents treated him matter-of-factly rather than with intense affects. Discipline was strict but positive rather than restrictive. Family life was smooth, active, routine, and effectant. Emotionally conflicted situations were avoided as were family discussions. Most early childhood memories were active. Personal interests during school years centered around sports and were reasonably diversified; despite the modal

pilot's high intelligence, his interests were generally nonintellectual.

A high need for achievement was persistent and pervasive in almost all the test data. This need was reflected by uniformly high MMPI scales for intellectual striving and needs to present self favorably; by high EPPS scales for high standards, good impressions, heterosexual effectiveness, taking charge and seeing things through; and by similar results on psychomotor and projective tests.

Answers to the questionnaire indicated that this need for achievement is more oriented to process than to long-range goals. For instance, fame and money are not prominent in the value system; responsibility, work, and task completion are. Responsibility pervades career, family life, and background. In past and present life this emphasis on responsibility is not necessarily coupled with a value on group conformity. For instance, in childhood these men modally belonged to groups only casually. An MMPI scale for being with others measured high while an EPPS scale (ego-ideal) for belonging to groups measured low. An EPPS scale of respect for elders was neutral.

As if to counterpoint achievement, there are strong needs for novelty and a tendency toward impulsiveness. For instance, an EPPS scale for seeking new situations was very high while one for keeping things running routinely was low. Bender-Gestalt results were characterized by carelessness followed by corrections. Rorschach results indicated some emphasis on immediate gratification.

Other results indicated that these needs for novelty are not particularly erotized. A scale of eroticism derived from the TAT was not rated high, nor was a guilt scale. Despite long periods away from home men in this group are typically happily married and there are few extramarital affairs. Historically, they recalled that their parents were not physically affectionate and that sexual behavior was of little concern to the family. Environmental changes during childhood were typical and may be related to adult needs for novelty; change

of residence was modal. Adventure books and physical outlets were popular. First interest in flying, usually in early adolescence, was accompanied by fantasies of excitement and thrills. With adulthood these sublimated into an enjoyment of precision, mastery, and control. A clinical impression was that many of these needs for novelty were temperamental and lifelong.

Interpersonal relationships (and by inference object relationships) were adequate and satisfying but typically distant. Earliest memories were modally object-related. MMPI, EPPS, and Rorschach results also showed evidence of anxiety toward others' attempts at closeness. Evidence from the TAT and questionnaire indicates that this anxiety is more specific for relationships with women than with men. TAT scales showed relationships with men as typically warmer and more smoothly assertive with men than women. A differential of relationships with men and women also extended back into childhood.

Typical relationships with father were described as unconflicted but distant. The father, modally a blue collar worker, was active, consistent, not close, and not at all permissive. Apparently he was hard but fair; most flyers said they were more like their fathers than mothers and got along better with brothers than sisters.

The mother was typically described as fairly warm and encouraging but also somewhat strict and hard to figure out. She seems to have run a stable, smooth, Protestant, middle-class home but with little opportunity for emotional expression. Despite this, the mother was loved and confided in. One can infer that conformity was the prize for a good relationship. This attitude probably affects the pilot's happy but casual adult marriages.

Thus, emotional distance is syntonetic for this group in relationship with both men and women but closeness with women is more likely to result in anxiety.

Testing showed modally high amounts of unconscious hostility. A TAT scale for outwardly directed hostile-aggressive fantasies

rated very high. An MMPI scale of hostility was variable. Indications are that these feelings are not completely syntonetic. For instance, aggressiveness as a value was rated neutrally on the EPPS. Aggression is kept within life-long bounds prescribed by society. Antisocial acting out is not typical, and there is no history of delinquency.

The question arises as to how much this hostility reflects strong aggressive drives as opposed to the results of frustration. Our impression is that it is more of a result of frustration. The pilot's particular combination of personality traits would lead one to predict frustrations: a strong sense of responsibility and need for achievement, little emotional communication, and high needs for novelty and excitement. Rorschach results show a modally high tendency to act out when frustrated.

Inner tensions, probably related to these factors, seem to lead to reduction in psychologic efficiency rather than a tendency toward symptoms. There is a general disparity between ambition for achievement and actual achievement. Intelligence tests scored lower on these scales requiring achievement than on those requiring ability. The capacity for high-level verbal abstract thinking was underdeveloped. Rorschach results indicated a narrowing of interests, emotional expression, intellectual richness, and creativity. There was a mild attenuation of self-acceptance in relationship to impulses and fantasies. TAT productions were also commonplace despite a high need for achievement. Questionnaire results indicated contentment as a frequent ideal in living. Inner contentment was not modally indicated by projective test results.

It should be emphasized that these trends toward underachievement constitute potential weakness rather than gross maladaptation. School, work, and social histories reflect life-long success. Areas of personality strength balance those of weakness. For instance, projective tests show strong reality testing and impulse control; there was adequate overall integration of affect needs. Other dominant strengths as reflected on the MMPI and EPPS

questionnaires are self-sufficiency, courage, personal skill, and persistence. Success at alloplastic pursuits minimizes the effects of internal limitations.

4. The typical personality pattern suits these men to adapt⁷ to military flying and thus fill a particular role in our society. It facilitates personality needs for a contented, stable family life, yet with some distance in the marital relationship. In addition, it is syntonic with a need for and background of frequent moves of family from location to location.

In theory, people with an almost infinite variety of combinations of personality traits should be naturally selected into successful adaptations to various roles in our relatively open society. A comparison of pilots with other homogeneous groups is instructive. For instance, young recreation trainees (homoclitcs) (24), when studied, appear to be similar to pilots in some ways but different in others. In common with the pilots they were alloplastically oriented; goal-seeking rather than goal-changing; blessed with health from birth on; strongly identified with their fathers; and raised in small-town, lower middle class families where the emphasis was on contentment, cooperation, parental agreement, definite boundaries to behavior, religious training, and work. In contrast to pilots they were intellectually less well endowed, placed more stress on doing good, and had a greater need to make friends. Pilots, on the other hand, have a greater need for achievement and are aware of more maternal inconsistency in their background. Thus, members of both of these study groups are healthy but with specific personality characteristics that have led them to contrasting yet successful adaptations.

⁷In a discussion of any particular adaptation the question arises as to how much is a function of past experience and how much is freed by present circumstances. This question loses much of its meaning when long-term adaptation is considered in a Piaget model (34). This model pictures a continuous series of assimilation-accommodation transactions with the environment in which previous experiences structure the individual's relationship to and incorporation of a new experience. This experience in turn creates an unconscious need to see the next new logical extension. The pilots seemed to fit a Piaget model. We were impressed by how comparable childhood life style was with current adaptation and how smooth the transition had been.

Other slots in society attract men with various combinations of personality traits that also contrast with these pilots. Their alloplastic intelligence, free of fantasy, is adaptive to the task; so are a strong reality sense, typical coping technics, and an athletic bent. Flying is consistent with these men's typical identification with a lower middle class, blue-collar worker father and with background emphasis on orderliness, respect, sports, and health. Social recognition and approval for a truly high level of achievement balances any tendency toward inner doubts.

Military life also suits their personality balance. Air Force life has very clear social structure. It provides an officer with prestige, travel, security, and income. Relationships with other men are consistent, stable, job-oriented, and closely defined. Combat or preparation for combat is aggressive and masculine; it sanctions hostility. External structure counters dystonic tendencies to act out. There are no great demands for creative achievement or introspection.

Family style in the military community allows an additionally smooth adaptation. There is a relatively closed system of ideology and mores. The military base provides small-town familiarity for the family when the man is away from home. It also structures consistency when the family moves from a look-alike base in one part of the world to another. This social structure is consistent with the pilot's typical-core-American nuclear family, with his Protestant-ethic background, and with his being a responsible father and older brother.

A flyer's life divides into three major areas; flying, military life, and family. Each will be considered in turn.

Most time spent in professional flying involves routine, practical competence, and meeting outside standards in repeated "checkouts" of high-level proficiency. The emphasis is on mastery of the environment through perceptual-motor performance rather than creative, abstract, intellectual, or mechanical abilities. Standard communications are clear,

economical, and distinct. For instance, radio communications are punctuated by such terse expressions as "negative," "affirmative," and "wilco" (I will comply). Decisiveness is essential. Thus the individual can either "hack it" (accomplish something) or "not hack it." Routine performance focuses on conflicts with the outside environment rather than more symbolic issues. For instance, a fighter pilot going through high-speed turns fixes his attention on instruments, controls, and the performance of the craft—not inner feelings or esthetics. The transport pilot sits back in his heavy seat surrounded by dials, switches, instruments, and crew. He looks out and makes the plane eat up the miles. Danger is present but infinitely less so when met with competence.

Comparisons of flying requirements and this group's modal characteristics show how good the fit is. For them flying synthesizes gratification of needs for achievement, individual initiative, novelty, excitement, routine, and responsibility. Noncreative, well-adapted corporation executives have similar good endowments; they also suffer from inner tensions, but are more creative both in expression of their intelligence and of their tensions (35). Mechanical engineers are alloplastically oriented but probably have less need for novelty and excitement. Physicians (36) are more autoplasmic, goal-changing, creative, and "normally" neurotic. Successful artists share a need for novelty but provide sharp contrasts in most other ways. We agree with White (33) that a true understanding of what factors lead to a particular personality balance or successful adaptation awaits more empirical data and that this investigation must cover the whole spread of human activities.

5. Understanding of the military flyer's typical, common personality traits, and adaptation can be applied clinically by psychiatrists toward evaluation of individual prognosis, management, and suitability for special tasks.

The touchstone of clinical practice, of course, remains an understanding, in depth, of each patient's unique dynamics. A modal

population description helps put this uniqueness in a context of social structure, thus revealing it more completely. Context is particularly necessary for psychiatrists in a military setting where their needs and values vary more from the social system than the patient's. Overidentification or rejection of patient by psychiatrists or confusion of the individual patient with the needs and values of the inclusive social system can be avoided by understanding the typical adaptation and its variations.

Psychiatric problems of pilots seen at aerospace referral centers are consistent with the modal pattern. Common precipitants for psychiatric symptoms are marriage, family conflicts, illness, and marital friction. These could be predicted from the modal de-emphasis on introspection and emotions. Most situations are serious only when viewed from the vantage of extreme performance requirements of modern aircraft. Many would probably go unnoticed in less closely watched professions (38). Retirement from flying or from the service can be particularly stressful (39). Assignment to an underground missile silo is not happily tolerated by test pilots. This could be predicted from needs for activity and outside stimulation. Issues of restriction or hostility (not flying) tend to be ego-dystonic. Thus, in war, one would expect that the most stressful situations for these men would be close-range exposure to the results of destruction, capture, and ambiguity. "Vasovagal syncope" is a symptom commonly seen at aerospace referral centers among air cadets. It is frequently precipitated by viewing films of aircraft accidents. Physical reasons are almost never found. Individual emotional precipitants are usually absent. From our modal results we speculate that this syncope is stimulated by a passive confrontation with unmastered inner feelings.

In reviewing cases, one seemed to condense the modal picture in decompensation, which is used here as a clinical example.

Problems began for Captain H., a 30-year-old successful fighter pilot when he was assigned to be a

flight controller. He felt restricted, bored, and frustrated by this duty even though he still flew 4 hours a month and the job could have led to advancement in the military hierarchy. After about 3 months he developed claustrophobia related to condoms during intercourse with his wife. He successfully sought affairs on his base; then developed claustrophobia in the partial pressure suit. He avoided discussion of these symptoms and tried to master them by sitting alone in a small room. He asked to be grounded when his anxiety extended to the cockpit. He was completely unaware of relationships between events and symptoms. Blandness and lack of guilt belied the fact that this behavior was completely inconsistent with his professed mores, values, and background. At the consultation center, the symptoms subsided and he easily acquired insight into their causes. He was able to pass performance tests in a pressure chamber and F100 flight. However, his confidence had been shaken, he felt mild anxiety, and for reasons of safety in relationship to high-performance craft he requested grounding.

The pilot's modal adaptation also has implications for management. For them, fantasies, symbolism, and introspection are not syntonic. Activity, proficiency, success, and short-range goals are. They prefer members of their own group. Thus, as might be expected, short-term goal-oriented management by a flight surgeon is usually most effective. Intensive insight psychotherapy could be expected to facilitate mastery over drive-reduction conflicts but would probably result in a new adaptation not including military flying.

With regard to selection for special missions the modal adaptation should be matched against the job requirements. Thus, Mercury astronaut job requirements are similar to those of test pilots. As mentioned earlier, most astronaut traits were identical with those of average pilots but better. For instance their average IQ was around 135, socioeconomic background was upper middle class, they were more successful at most tasks, and 20% were named "Junior" (40). Outstanding members of a different typical type may need to be found for missions with different requirements—for example, the long, dull, cramped life forecast for interplanetary travel (41). Even outstanding people perform better when the task is syntonic to their basic adaptive patterns. For the typical pilot, the patterns are

fairly clear. Figure 10 illustrates the continuum of good and poor extremes to the pilot's modal adaptation.

The center column lists traits already discussed as salient to well-adjusted flyers. The column on the left matches these traits with conditions that might be expected to predispose or precipitate maladaptation. The column to the right matches modal traits with conditions that might predispose superior adaptations, as with the astronauts. We would expect pilots to fall into one of these three columns at any time during their lives according to a theoretical normal distribution curve of each parameter. Expected problem areas listed on the left are consistent with our experience and that of others (38) at referral centers for flyers. Expected conditions for superior adaptation are very consistent with descriptions of astronauts (30, 31, 40).

V. DISCUSSION

Standard psychologic tests and a background questionnaire were administered to 50 well-functioning pilots. To obtain as much significant information as possible, approximately 1,200 questions were asked each subject in 8 different tests. Each item in most of the tests was analyzed to find the modal answer for the group. These answers were then put together into modal results for each particular test. A description of the modal pilot was developed on the basis of information confirmed by several tests.

The modal pilot was a captain, 29 years old, Protestant, married, and the father of two children. He flew regularly scheduled missions in combat-trained jet aircraft. His IQ was 119 and he typically described himself as matter-of-fact, easy going, and loyal; the type of person who would accept things at face value, take direct action when possible and work best with a team. In general, he felt that this way of life was working for him. No serious emotional upsets or adjustment problems were described. The few emotional upsets that were experienced were reactive to situations at work. Family and personal relationships were handled




CONDITIONS FOR EXPECTED FAILURE OF ADAPTATION (GROUNDING OR PATIENT STATUS) 	TYPICAL ADULT ADJUSTMENT (MODAL MILITARY PILOT) 	CONDITIONS FOR EXPECTED SUPERIOR ADAPTATION (THE TEST PILOT OR ASTRONAUT) 
FAILURE TO SUCCEED AT A GOAL	ALLOPLASTIC SELF SUFFICIENT SHORT RANGE GOAL } ORIENTATION	MORE AMBITIOUSNESS WITH SUCCESS
RESTRICTION FROM FLYING RETIREMENT	ACHIEVEMENT NOVELTY RESPONSIBILITY } NEEDS	OPPORTUNITY FOR A LIFE STYLE THAT SYNTHESIZES THESE NEEDS
AMBIGUOUS SITUATIONS (PARTICULARLY SOCIAL) INCONSISTENCY OF BACKGROUND WITH CURRENT TASK	TERSE DIRECT NON-INTELLECTUAL EMOTIONALLY AVOIDANT } COPING AND COMMUNICATIONS	EXCEPTIONAL CONSISTENCY OF BACKGROUND AND TASK
LESS WELL ENDOWED - INTELLECTUALLY OR PHYSICALLY	BRIGHT-NORMAL INTELLIGENCE PERCEPTUAL MOTOR SKILLS COURAGE AND ENERGY	OUTSTANDING ENVIRONMENT BETTER SOCIAL OR ECONOMIC CONDITIONS WHILE GROWING UP
PHYSICAL ILLNESS INSTABILITY OF BACKGROUND WHILE GROWING UP NEUROTIC PREDISPOSITION	EXCELLENT PHYSICAL HEALTH LACK OF NEUROTIC SYMPTOMS	FREEDOM FROM NEUROTIC CONFLICTS
INSOLUBLE PERSONALITY CONFLICT AT WORK	UNCONFLICTED RELATIONSHIPS WITH MEN	WORK WITH TEAMS OF SIMILAR JOB ORIENTED MEN
TOO MUCH EMOTIONAL STIMULATION FAILURE IN FAMILY STABILITY	ANXIETY WHEN TOO CLOSE TO WOMEN	MARRIAGE TO SELF CONTAINED WOMEN GOOD FAMILY FUNCTIONING EASILY EXPLAINED ABSENCES FROM HOME
UNAVOIDABLE CONFRONTATION WITH INNER EMOTIONAL LIFE	RELATIVE INFLEXIBILITY FOR DRIVE REDUCTION	BETTER CAPACITY FOR EMOTIONAL INTROSPECTION
IRRESPONSIBILITY OR LACK OF SOCIAL SANCTIONS FOR HOSTILITY	WELL CONTROLLED UNCONSCIOUS HOSTILITY TENDENCY TO ACT OUT	A NON-HOSTILE BUT AGGRESSIVE ASSIGNMENT
EXCEPTIONALLY STRONG LIMITATIONS	SELF IMAGE CREATIVE INTELLECTUAL } LIMITATIONS	ADVANCED EDUCATION A BROADER RANGE OF INTERESTS
UNAVOIDABLE CONFRONTATION WITH SELF LIMITATIONS	LOW TOLERANCE FOR PERSONAL IMPERFECTIONS	MUCH RECOGNITION AND APPROVAL FOR LIFE LONG SUCCESS

FIGURE 10

Integrative summary of modal kinds of adaptation revealed by tests and other sources of information, showing three levels of adaptation: marginal, modal, and superior.

distantly but smoothly. By any standard, the average pilot had made a good adjustment to military life. The high standard of performance he set for himself in his work was adaptive to the demands of modern aircraft. In addition, distant interpersonal relationships were adaptive to the sudden separations and frequent disruptions of military life.

This style of adaptation was not limited to the current situation. Similar personality traits were described for the various phases of his earlier personality development. The average pilot was the first-born child of a stable, middle-class family from a city of fewer than 50,000 people. The family was self-contained, well-functioning, and matter-of-fact.

Daily life revolved around activities rather than emotions. There was emphasis on discipline and responsibility. While the parents did not fight, they were not very affectionate.

The subject had made a good adjustment in school and play. Much of his energy was channeled into sports and group activities. There was some avoidance of solitude. Little adolescent turmoil was described. The sexual history was conventional. His interest in flying began at age 14. Initially it was thought of in terms of pleasure and excitement. Now satisfaction derives from mastery and competence. His chief reason for joining the Air Force was to fly. Flying remains the chief satisfaction of his military career. His goal is to remain operational rather than achieve positions of power or glory.

Only after looking more closely at some of the projective and specialized intelligence tests were we able to find personality weaknesses to temper the impression of psychologic strength. He had not completely mastered his internal emotional life. Projective tests showed stronger emotional needs than were consciously described. Inner feelings tended to be perceived as external and managed by means of external changes. Introspection was thought to be a desirable trait but characteristically directed toward changing the environment rather than the self. This was effective for minor but not major emotions. Intellectual achievement was also lower than would have been expected. There was an attempt to avoid ambiguities and keep thoughts on a concrete, organized, and rational level. One test of abilities for high-level verbal abstraction placed the modal pilot at an underachieving 17th percentile for people with Bachelor of Science degrees. He was unaware of this underachievement and also tended to overestimate his capacities.

There was no evidence that serious personality defects were responsible for these limitations. The pilot was adequate in capacity to relate to other people, control of impulses, defenses against anxiety, evaluation of reality, integration of perceptions, and execution of

action. Nor was there evidence of severe psychosexual fixation, bizarre fantasy life, asymptomatic neurosis, or pressures from environmental sources.

Positive findings suggested that the emotional and intellectual limitations were rooted in a need for cautious relationships. The average pilot described his ideal values as being inconsistent with a supportive, openly competitive, or emotionally close relationship. His emotional feelings were more secure when fantasies were directed toward men rather than women. Despite this fact, even relationships with men were kept casual. Very high needs for achievement were channeled away from relationships and into more impersonal and unsymbolic aspects of flying. Fantasies about women had superficial, directive, and even hostile qualities.

The need for caution about close relationships was consistent with childhood memories. Most memories were pleasant but lacked emotional intensity. Relationships with siblings and schoolmates emphasized working with groups and sports. Both parents had lived active lives. Mother was described as warmly encouraging but not predictable. Father was described as reasonable but strict and for the most part looked up to.

The average pilot is well suited to his job. It meets his needs for excitement, responsibility, achievement, structured relationships with men, and a casual family life. These personality traits that make him an excellent pilot could bring him grief in other circumstances (for instance, in routine work as an engineer); his work, though directed toward the environment, would require high-level abstract thinking and long-range planning. Retirement, duty in a missile silo, and even promotion to a command position (42) could also cause adjustment problems. Similar reasoning applies to family life. Adjustment problems might result from an emotionally demanding marriage or financial problems. Factors interfering with responsibilities toward children could also create adjustment problems. In general, then, there is a relative emotional inflexibility which

can lead to difficulties in adjustment for people in this group. In any of these situations pilots on the lower end of a continuum of personality strength could be expected to develop psychiatric symptoms. Outstanding individuals might adjust, albeit unhappily and inefficiently, to any situation. A satisfactory adjustment could be improved by support of typical per-

sonality strengths: courage, responsibility, persistence, consistency, and personal skill. The objective evaluation of sickness and health in individual members of a social group such as military flyers depends on a thorough understanding of the psychologic strengths and weaknesses of the group as a whole.

REFERENCES

1. Bond, D. B. *The love and fear of flying*. New York: International Universities Press, 1952.
2. Grinker, R. R., and J. P. Spiegel. *Men under stress*. Philadelphia: Blakiston, 1945.
3. Eggertson, P. F. Suicide by Air Force personnel 1958-1964. *Milit. Med.* 133 (1): 26-32 (Jan. 1968).
4. Bohannon, R. L. Transient personality disturbances, table 25. *In* Thirteenth Annual Report of the USAF Medical Service, 1 July 1966 - 30 June 1966. Office of the Surgeon General, USAF, Washington, D.C.
5. Fine, P. M., and C. L. Jennings. Coping and developmental theory: Applicability to the selective study of normal men. *Aerospace Med.* 37:695-701 (1966).
6. Sundberg, N. D. The practice of psychological testing in clinical services in the United States. *Amer. Psychol.* 16:79-83 (1961).
7. Lamb, L. E. Aeromedical evaluation for space pilots. USAF SAM Special Report, Brooks AFB, Tex., July 1963.
8. Jennings, C. L. The use of normative data in the psychological evaluation of flying personnel. *In* Psychiatry in aerospace medicine, *International Psychiatric Clinics*, vol. 4 (1). Boston: Little, Brown and Co., 1967.
9. Fulkerson, S. C., S. L. Freud, and G. H. Raynor. The use of the MMPI in the psychological evaluation of pilots. *J. Aviation Med.* 29:122-129 (1958).
10. Dahlstrom, W. G., and G. S. Welch. *An MMPI Handbook*. Minneapolis: University of Minnesota Press, 1960.
11. Edwards, A. L. *Manual for the Edwards Personal Preference Schedule*. New York: Psychological Corp., 1953.
12. Cantrell, G. K., F. E. Holdridge, R. A. DeGaugh, and C. J. Mullins. Application of a psychometric-clinical approach to personnel selection for counterinsurgency duty, PRI-TR-64-24, Personnel Research Laboratory, Lackland AFB, Tex., Oct. 1964.
13. Wechsler, D. *The measurement of adult intelligence*, 3d ed. Baltimore: Williams and Wilkins Co., 1944.
14. Miller, W. S. *Müller analogies test manual*. New York: Psychological Corp., 1960.
15. Bender, L. *A Visual Motor Gestalt Test and its clinical use*. Research Monographs No. 3, American Orthopsychiatric Association, New York, 1938.
16. Pascal, G. R., and B. J. Suttell. *The Bender-Gestalt Test. Quantification and Validity for Adults*. New York: Grune and Stratton, 1951.
17. Klopfer, B., and H. H. Davidson. *The Rorschach technique. An introductory manual*. New York: Harcourt, Brace and World, Inc., 1962.
18. Klopfer, B., M. D. Ainsworth, W. G. Klopfer, and R. R. Holt. *Developments in the Rorschach technique*, vol. I. New York: Harcourt, Brace and World, Inc., 1954.
19. Beck, S. J. *Rorschach's test. I. Basic processes*. New York: Grune and Stratton, 1950.
20. Murray, H. A. *Thematic Apperception Test manual*. Cambridge, Mass.: Harvard University Press, 1943.
21. Barnes, D. J. A pilot study in the analysis of thematic apperception test protocols. *In* Proceedings of the Twelfth Annual Conference of Air Force Behavioral Scientists, USAF School of Aerospace Medicine, Brooks AFB, Tex., Nov. 1965.

22. Murray, H. A. *Explorations in personality*. New York: Oxford University Press, 1938.
23. Fine, P. M., and C. L. Jennings. Coping and developmental theory: Applicability to selective study of normal men. *SAM Aeromed. Rev.* 1-65, Apr. 1965.
24. Cantrell, G. K., and B. O. Hartman. Trends in aircrew attitudes and job-satisfaction. *SAM-TR-68-19*, Feb. 1968.
25. Grinker, R. R., Sr., R. R. Grinker, Jr., and J. Timberlake. "Mentally healthy" young males (homoclitics). *Arch. Gen. Psychiat.* 6:405-453 (1962).
26. Kinsey, A. C., W. B. Pomeroy, and C. E. Martin. *Sexual behavior in the human male*. Philadelphia: W. B. Saunders Co., 1948.
27. Erickson, E. H. Identity and the life cycle. *Psychol. Issues*, vol. 1 (1). New York: International Universities Press, 1959.
28. Sullivan, H. S. *The interpersonal theory of psychiatry*. New York: Norton, 1953.
29. Offer, D., and M. Sabshin. Normality, pp. 97-112. New York: Basic Books, 1966.
30. Korchin, S. J. Personality characteristics of Mercury astronauts. Presented at the Annual Meeting of the American Association for the Advancement of Science, Philadelphia, 28 Dec. 1962.
31. Ruff, G. E., and E. Z. Levy. Psychiatric evaluation of candidates for space flight. *Amer. J. Psychiat.* 116:385-391 (Nov. 1959).
32. Heller, J. *Catch-22*, p. 463. New York: Dell Publishing Co., 1955.
33. White, R. W. The concept of competence. *Psychological issues*, vol. 66 (5), 1959.
34. Kohlberg, L. In *The development of sex differences* by Eleanor E. Malloby, pp. 82-173. Stanford: Stanford Univ. Press, 1966.
35. Warner, W. L., and J. Abegglen. *Big business leaders in America*. New York: Atheneum, 1963.
36. Levitt, L. P. The personality of the medical student. *The Chicago Medical School Quarterly* 25 (4): 201-214 (1966).
37. Kaplan, A. A philosophical discussion of normality. *AMA Arch. Gen. Psychiat.* 17 (3): 328-330 (Sept. 1967).
38. Reinhart, R. F. The flyer who falls: An adult situational reaction. *Amer. J. Psychiat.* 124 (6):48-52 (Dec. 1967).
39. McNeil, J. S., and M. B. Giffin. Military retirement: The retirement syndrome. *Amer. J. Psychiat.* 123 (7): 848-853 (Jan. 1967).
40. Perry, C. J. G. Psychiatric selection of candidates for space mission. *J.A.M.A.* 194: 841-851 (1965).
41. Hartman, B. O., and D. E. Flinn. Crew structure in future space missions. *Lectures in Aerospace Medicine, USAF School of Aerospace Medicine, Brooks AFB, Tex., 1964.*
42. Hartman, B. O. Psychologic factors in flying fatigue. In *Psychiatry in Aerospace Medicine*, C. J. G. Perry (ed.). New York: Little, Brown, and Co., 1967.

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